WALSH DECLARATION

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of Application of Verizon New Jersey, Inc., BellAtlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a/ Verizon Enterprise Solutions), Verizon Global Networks, Inc., and Verizon Select Services, Inc., for Authorization to Provide In-Region InterLata Services in New Jersey	)	CC Docket No. 01-347

DECLARATION OF RICHARD J. WALSH
ON BEHALF OF AT&T CORP.

I. QUALIFICATIONS AND PURPOSE OF TESTIMONY.

1. My name is Richard J. Walsh. My business address is 33 Francis Drive, Hillsborough, NJ, 08844. I am Senior Telecommunications Analysis and founder/CEO of Richard J. Walsh & Associates, Inc.

2. I began my telecommunications career in 1970 with New England Telephone (subsequently NYNEX) in the Central Office Equipment Installation Department. From 1975 to 1984, I held positions in the Customer Services Outside Plant Department, as a Completions Clerk to the Installation Control Centers, a Facilities Assigner, and Electronic Switching Systems (ESS) Conversions Facilities Assigner; and as a Technical Support Staff Manager for ESS Conversions where I trained, supervised and directed non-management craft and semi-craft personnel in ESS conversion activities, and provided technical support to organizations that were responsible for records conversion and mechanization. Additionally, I was responsible for technical matters associated with the dial for dial (electromechanical to

electronic and digital) switch conversions. I was also instrumental in helping New England Telephone develop alternative plans for converting manual plant records to mechanized systems by defining system requirements and analyzing vendor software systems.

3. In 1984, I interned at Bellcore (Bell Communications Research) to develop system and training requirements for its Facility Assignment and Control System ("FACS") product line. I later accepted an assignment as a Staff Manager supporting FACS conversion activities where I was responsible for systems training, methods and procedures development, and the staffing of a company-wide FACS system hotline.

4. From 1986 to 1993 at NYNEX, I managed the day-to-day operations of the Rhode Island Mechanized Loop Assignment Center (MLAC), which included service order provisioning, field assistance, engineering work order preparation and support, as well as FACS database maintenance. I also worked as an Outside Plant Engineer designing and preparing work prints for toll, exchange feeder, and distribution cable jobs, estimating work order cost analysis, assuring work order quality and managing construction activities.

5. In 1993, I worked with Bellcore in its Software Assurance Division. At Bellcore, I provided systems integration release testing support for the FACS product line. In 1995, I transferred to the Professional Services Division as Lead/Senior Consultant in the Telecommunications Business Process Consulting group. During this time, I provided consulting to major telecommunications firms in areas concerning Telecommunication Reform, Local Number Portability, Telecommunications Network Management (TMN) Systems Architecture, and Non-Recurring Costs. In 1997, I retired from Bellcore to start my own telecommunications consulting company.

6. The purpose of my testimony is to respond to the statements submitted by Verizon in its reply comments and in its *Feb. 20 Ex Parte*.[1] First, I show that Verizon's attempt to disguise its inflated hot cut non-recurring costs ("NRCs") by amortizing them over time and then combining them with unidentified "recurring rates" must be rejected. A correct interstate hot cut rate comparison shows that Verizon's New Jersey hot cut rates are well above those charged by Verizon in neighboring states. Verizon offers no explanation for these interstate hot cut NRC discrepancies.

7. Second, I show that the methodology used by Verizon to compute its hot cut NRCs is based on Verizon's embedded network and not on the forward-looking network as defined by the New Jersey Board of Public Utilities ("NJBPU"). In addition, Verizon's hot cut NRC cost model contains numerous inefficient manual processes that would not be necessary in Verizon's embedded network, and certainly would not be necessary in a forward-looking network. Verizon's claims in its *Feb. 20 Ex Parte*, that these costs are justified by some "new" information are baseless.

8. Third, I demonstrate that, based on the forward-looking network defined by the NJBPU, Verizon's hot cut NRCs should not exceed $4.35/line.[2]

II. VERIZON'S VERMONT HOT CUT NRCs ARE SUBSTANTIALLY HIGHER THAN THOSE IN OTHER VERIZON TERRITORIES.

9. The commenters in this proceeding have demonstrated that they cannot profitably use UNE-L to enter New Jersey's local markets due to Verizon's inflated New Jersey hot cut NRCs. *See, e.g.,* ASCENT Comments at 5; Cavalier Comments at 10; AT&T Comments

[1] *Ex Parte* Letter from Clint E. Odom, Verizon, to William Caton, FCC, CC Docket No. 01-347 (dated February 20, 2002) ("*Feb. 20 Ex Parte*").

[2] As shown in my New Jersey testimony (attached as Exhibit 1), in a fully forward-looking network, Verizon's hot cut NRCs would not exceed $2.77. *See* AT&T Comments, Exhibit 1.

at 14; AT&T Reply Comments at 8. The inability of potential entrants to enter New Jersey via UNE-L is not surprising. As demonstrated by AT&T in its opening comments, Verizon's New Jersey hot cut NRCs of $159.76 (without a premises visit) and $233.12 (with a premises visit) exceed those charged by Verizon in Virginia, Maryland, Pennsylvania, Delaware and Massachusetts by 117 percent to over 3000 percent. *See* AT&T Comments, Sczepanski Decl. Tables 1-2. Missing from that analysis was a comparison to the hot cut rates in New York because, at the time of AT&T's filing, those rates were still the subject of a settlement negotiation. Since then, a joint agreement has been reached that caps Verizon's New York hot cut NRCs at $35.00. Thus, Verizon's New Jersey hot cut NRCs are at least 4.5 times higher than in New York.[3]

10. Verizon does not explain why its hot cut NRCs for New Jersey should be so much higher than those in neighboring states. Instead, Verizon's witnesses attempt to hide this huge hot cut NRC disparity by amortizing the New Jersey hot cut rates over 36 or 60 months and then combining them with some undefined "recurring rates." *See* Verizon Reply, Garzillo/Prosini Decl. ¶ 28. Based on this flawed interstate comparison, Verizon's witnesses conclude that Verizon's hot cut NRCs – which are from 117 to over 3000 percent higher than those in other states – are actually quite similar. That analysis is obviously flawed.

11. As an initial matter, amortizing Verizon's New Jersey hot cut NRCs over several months does not (and should not) change the relative size of the NRCs among different states. The fact that Verizon's amortized analysis actually changes the relationship of hot cut rates among states as they are amortized should, therefore, raises a red flag.

[3] Based on this recent Joint Agreement, Verizon's claim that its New York hot cut rates are higher than its New Jersey hot cut rates is wrong.

12. Verizon disguises the obvious interstate hot cut NRC discrepancy by improperly combining the amortized New Jersey hot cut NRCs with its recurring costs. The Commission has long recognized that regardless of the level of a BOC's recurring rates, a BOC can and will evade competition if it is allowed to increase potential competitors' costs significantly through non-recurring charges.[4] That is because carriers must pay NRCs – including hot cut NRCs – up-front. If those NRCs are sufficiently overstated, then potential new entrants will not be able to afford to enter the market. Thus, Verizon's hot cut NRCs must be evaluated separately from its recurring rates, not combined with recurring rates.

13. In any event, Verizon's completely unexplained recurring/nonrecurring comparisons are bare assertions, unsupported by any data or calculations. Indeed, Verizon does not even explain which "recurring" rates it has combined with the NRCs.

III. VERIZON'S NEW JERSEY HOT CUT RATES DO NOT ADHERE TO THE APPROACH REQUIRED BY THE NJBPU.

14. Verizon claims in its *Feb. 20 Ex Parte* that its New Jersey hot cut NRCs comply with the NJBPUs Order. That is not true. The NJBPU determined that a forward-looking network in New Jersey be comprised of 60% integrated DLC with the remaining being 40% end-to-end copper.[5] Verizon's expert testimony, however, shows that its hot cut NRCs are

[4] *See, e.g., AT&T Communications,* 103 FCC 2d 277, ¶ 37 (1985) ("It is evident that nonrecurring charges can be used as an anticompetitive weapon to . . . discourage competitors"); Second Memorandum Opinion and Order on Reconsideration, *Expanded Interconnection with Local Telephone Company Facilities*, 8 FCC Rcd. 7341, ¶ 43 (1993) ("absent even-handed treatment, nonrecurring reconfiguration charges could constitute a serious barrier to competitive entry"). *See also* 47 C.F.R. § 51.507(e) ("[n]onrecurring charges . . . shall not permit an incumbent LEC to recover more than the total forward-looking economic cost of providing the applicable element").

[5] *See* Summary Order of Approval, *The Board's Review of Unbundled Network Elements, Rates Terms and Conditions of BellAtlantic-New Jersey, Inc.*, Dkt. No. To00060356, at 6 (Dec. 17, 2001).

not based on that network configuration, but on Verizon's embedded network configuration with far less integrated DLC. *See* Garzillo/Prosini Reply Decl. ¶¶ 21-24. Consequently, Verizon's hot cut NRCs plainly fail to comply with the NJBPUs Order, and do not comply with TELRIC. Thus, Verizon's hot cut NRCs are predictably overstated because the processes required to carry out hot cuts in Verizon's embedded network are more complex and costly than those required to carry out hot cuts in the forward-looking network as defined by the NJBPU.

15. For example, because Verizon's cost model is based on its embedded network, it does not reflect the NJBPU's mandate that Verizon's New Jersey network contain 60 percent integrated DLC. In fact, Verizon's cost study assumes that all lines are served by copper-feeder. *See* Exhibit 1 (attached). Consequently, the processes required to implement migrations orders in Verizon's embedded network include costs of manual and other inefficient processes that do not exist in the forward-looking network defined by the NJBPU.[6] As I explain below, the costs of migrating customers served by integrated DLC lines is far less than the cost of migrating customers on copper feeder lines.

IV. VERIZON'S HOT CUT NRCs INCLUDE COSTS OF NUMEROUS ACTIVITIES THAT WOULD NOT EXIST IN A FORWARD LOOKING NETWORK.

16. Verizon's hot cut NRCs are inflated by the inclusion of numerous activities that should not even exist when performing hot cuts on Verizon's embedded network, and certainly would not exist in a forward looking network.[7]

[6] In addition, it does not appear that Verizon's complied with this order. Although the NJBPU order eliminated premises visits with migration orders, Verizon continues to include premises visits for computing costs for migration orders.

[7] As explained in my New Jersey testimony (Exhibit 1 attached), these deficiencies are identified in Verizon's cost study materials.

17. Verizon's cost calculation, for example, double-recovers disconnection costs. The "two-wire" and "four-wire" hot cuts are nothing more than migration UNE-loop requests. A migration is simply two distinct service orders with the same "due-date" and "due-time"; a "disconnect of the existing service", and a "new connect" of the two-wire or four-wire UNE-Loop. Verizon collects the costs of disconnecting retail customers from those customers as up front cost when Verizon initially provisions the service to those customers, *i.e.*, retail customers prepay the disconnect charges for their lines. Yet, Verizon collects a "disconnect" fee again from CLECs through its hot cut rates. This double recovery is a plain violation of TELRIC principles.

18. In addition, Verizon claims that for every hot cut order, Verizon technicians will take several minutes to contact the CLEC and ask it if it will actually do the work on the CLEC end to perform the hot cut. That process is entirely unnecessary; the CLEC order itself represents its commitment to do the work.

19. Verizon also claims that certain manual processes must be undertaken (e.g., phone calls) to communicate to various workgroups that work will be required to perform a hot cut. Those communications are unnecessary because they are (or should be) automated. For example, there is no need to engage in manual processes to communicate to the central office frame technician (as Verizon's cost model assumes) that there is a pending order in the OSS because the frame technician already knows about the order from Verizon's pending order list. Expending labor time to duplicate automated OSS instructions (or to engage in activity that would be automated in the forward-looking cost model defined by the NJBPU) defeats the purpose of automated OSS efficiency and cost savings.

20. Another problem with Verizon's hot cut NRCs is that they include costs incurred by Verizon to check that its records correctly identify the line that will require a hot cut. In other words, Verizon charges CLECs, through hot cut rates, to make sure that Verizon's own records are accurate. These several minutes of labor are not properly attributable to the hot cut process, and CLECs should not be forced to pay them.

21. Verizon's hot cut processes also improperly assume that a Verizon technician, at the time the migration order is to take place, will receive yet another telephone call to yet again confirm that the CLEC really meant to order the migration to ensure constant service to the end-user customer. Furthermore, Verizon's hot cut process assumes that a Verizon technician will constantly monitor the migration process until the migration order has been completed.[8]

22. These labor intensive processes are not necessary. The central office frame technician can (ahead of the scheduled due date and due time) terminate the cross-connections at the CLEC equipment to the cable and pair without affecting working service. The cable pair is double tapped going to both Verizon's port and the CLEC port. If the service order says the due time is 10:00 am, it is expected that Verizon's OSS would release the translation message at that time to Verizon's switch, thus terminating their service. The CLEC's OSS would then release its translation message to activate their service, thus migrating the customer without the need for constant monitoring by Verizon.

[8] Notably, Verizon's current hot cut process actually permits Verizon to stop a scheduled hot cut if the CLEC's "dial-tone" is not present at the precise time indicated on the LSR, even if the CLEC's dial tone is turned on a minute later. This is very disruptive to the customer who expects the service to be working. Of course, the customer blames the CLEC for these problems even though they were caused by Verizon. Only the CLEC who places the order for the UNE-Loop should be permitted to alter that request. Verizon's responsibility is to deactivate the customer's retail service on the due date and time as indicated by the CLECs request.

23. Contrary to Verizon's claim that the hot cut process is "new" (*see Feb. 20 Ex Parte*), this process has been commonly used for years to migrate customers in a matter of seconds from one switch to another during switch cut-over conversions. The new switch office equipment is cross-wired to existing cable pairs and translations are programmed in the switch. On the night of the conversion, instructions are sent to the old (disconnecting) switch to terminate (or shut-down) service to that switch. Within a few seconds, a similar instruction is sent to the new switch to turn-on translations. This allows everyone in the old switch to be migrated to the new switch. While I was in NYNEX, I was personally involved with many switch conversions as an ESS Conversion supervisor. Verizon should have modeled their hot cut process like their switch conversion process, but they did not. Instead, they modeled an unnecessarily labor intensive process that has the effect of inflating NRCs.

24. The only manual labor (and non-recurring cost) that should be assessed to the CLEC in the hot cut process, is for the connection of the UNE-Loop to the CLEC's equipment. The manual activity involved in the connection of the UNE-Loop is the connection of two copper wires at the Central Office MDF, which can be accomplished in a matter of minutes (when the customer receives service over fiber feeder this connection can be made electronically with no manual labor). Verizon's elaborate cost scheme, involving numerous coordinating personnel from the RCCC and other Verizon employees, as they identify and disconnect the already paid-for retail service is, therefore, unjustified.

25. Verizon claims that much of the manual work that it performs is at AT&T's request. *See Feb. 20 Ex Parte* at 6. That is extremely misleading. In New York, Verizon's initial efforts at performing hot cuts were abysmal. In response to the CLECs' protests, and in order to further in New York 271 aspirations, Verizon put a number of "band

aid" fixes in place to ensure that hot cuts were performed on time and that CLEC customers were not left stranded without service. Most of these fixes involved a great deal of manual duplication of effort. These short-term (and expensive) fixes have now crept their way into Verizon's practices in its other states, including New Jersey. And Verizon is attempting to include its inefficient short-term fixes – which were implemented because of Verizon's poor performance in the fist place – in its New Jersey hot cut rates. Verizon's asserts that instead of being required to implement efficient OSS and hot cut procedures, it should be compensated for all the additional (and unnecessary) manual labor and layers of process that it had to implement to fix its own mistakes and incompetencies in order to obtain Section 271 approval in New York. These costs are at clear odds with TELRIC principles, which dictate that rates reflect efficient technology operated by an efficient carrier.

V. GIVEN THE FORWARD-LOOKING NETWORK DEFINED BY THE NJBPU, VERIZON'S HOT CUT RATES SHOULD BE NO HIGHER THAN $4.35.

26. As explained above, Verizon's hot cut NRCs for New Jersey are substantially inflated by numerous assumptions that are not consistent with the forward-looking network defined by the NJBPU. Using Verizon's cost model, I have attempted to fix many of these problems and recalculate Verizon's hot cut rates. In particular, I assumed the use of 60% integrated DLC in Verizon's network and removed many of the inefficient manual processes that would not be necessary given the existence if integrated DLC. As shown in Exhibit 3, that process produces a hot cut rate of $25.46.[9] Of course, that rough estimate does not address the fact that Verizon's cost model contains numerous embedded TELRIC errors that inflates even

[9] Verizon's New Jersey NRC cost model identified non-recurring rates for both copper-feeder (*i.e.*, analog loops) and integrated DLC loops, both of which have the same provisioning cost identified by the NJBPU of $23.15. Based upon the network mix, recommended by the NJBPU

this hot cut NRC estimate. *See* Exhibit 4 (my testimony from the New Jersey state proceeding identifying these errors).

27. A true TELRIC approach based on the NJBPU Order results in New Jersey hot cut rates that are no higher than $4.35. *See* Exhibit 3. As noted above, the NJBPU found that a forward-looking network would contain 60% integrated DLC loop and 40% copper-feeder loops. As described below, the forward-looking cost of a hot cut is much lower for lines served by integrated DLC than those served by non-DLC lines. Therefore, to compute the average cost of a hot cut in New Jersey, it is necessary to compute the cost of a hot cut for both integrated DLC and for non-DLC lines and then compute the weighted average of those costs.

28. *Integrated DLC Costs.* A hot cut performed on lines served by integrated DLC with efficient OSS requires virtually no manual processes because the hot cut can be performed electronically.[10] As fully documented in attachments 3 & 3c hereto, the cost of a hot cut on a loop served by integrated DLC is $ 0.54.[11]

29. *End-To-End-Copper.* When hot cuts are preformed on copper-feeder facilities only minimal manual processes are required. The cost efficient method of performing a hot cut on copper-feeder facilities is the same as that which is used today for many of Verizon's in provisioning its own retail services. The process begins when the service order is pending within Verizon's OSS. Like any number of Verizon's retail services, a CO Frame technician withdraws the order and terminates the cross-wire between the ILEC's loop and the CLEC's port

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and applied to the adjusted service ordering cost (using the same fallout rates indicated for the "Two wire New Initial") the total hot cut non-recurring cost would be $25.46. *See* Exhibit 3.

[10] There is no question that hot cuts can be performed on lines served by integrated DLC. *See, e.g.*, Exhibit 2.

[11] This rate includes the both installation and future disconnect cost. *See* Exhibit 3 and 3c.

ahead of the specific due-date and due-time.[12] On the due-date and at the due-time, Verizon's OSS releases a switch translation message (electronically) to the local switch, which deactivates the retail service. As indicated by the CLEC's request, the CLEC sends its own translation message to the CLEC's switch shortly thereafter (*i.e.*, the designated due-date and due-time), which activates the end-user customer's service on the CLEC's switch. As shown in Exhibit 3 and 3b (attached), the cost of these processes is $10.06 per line. *See Exhibit 3 AT&T Element #6, "POTS / ISDN BRI Migration (UNE Loop) -100% Copper* (attached).

30. The weighted average of these costs – 60% integrated DLC and 40% copper feeder – is $4.35. *See Exhibit 3 Recommendations by AT&T -Melded Rate (Installation + Disconnect), element #6, "POTS / ISDN BRI Migration (UNE Loop)" and element #8 "POTS / ISDN BRI Disconnect (UNE Loop).* Thus, the proper forward-looking hot cut NRC for New Jersey is no more than $4.35. *See* Exhibit 3.

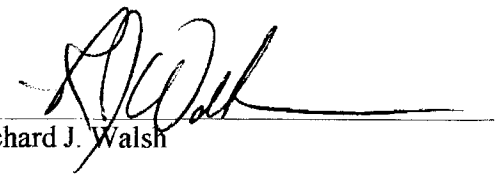
[12] The "due-date" and "due-time" represent the specific time of day negotiated by the CLEC with the end-user customer. This data is passed to Verizon's OSS via the Local Service Request.

VI. CONCLUSION.

31. For the foregoing reasons, Verizon's New Jersey hot cut rates are far above those that it would incur in the forward-looking network defined by the NJBPU.

VERIFICATION PAGE

I declare under penalty of perjury that the foregoing Declaration is true and correct.



Richard J. Walsh

Executed on: February 28, 2002

WALSH EXHIBIT 1

STATE OF NEW JERSEY

BOARD OF PUBLIC UTILITIES

IN THE MATTER OF THE REVIEW OF	)	
UNBUNDLED NETWORK ELEMENTS	)	Docket No. TO00060356
RATES TERMS AND CONDITIONS OF	)	
BA-NJ	)	

Rebuttal Testimony of

Richard J. Walsh

ON BEHALF OF

AT&T COMMUNICATIONS OF NJ, L.P.

October 12, 2000

PUBLIC VERSION

I. INTRODUCTION.

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, EMPLOYER AND PRESENT POSITION.

A. My name is Richard J. Walsh and my business address is 33 Francis Drive, Belle Mead, New Jersey, 08502. I am presently providing consulting services to AT&T as a Technical Analyst in the Local Services and Access Management (LSAM) / Local Connectivity Cost, Price, and Planning Division.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my testimony is to illustrate how and why the Verizon-New Jersey, Inc. ("VNJ" or "Verizon") non-recurring cost model does not comply with FCC requirements and would inhibit competition resulting in negative impact to customers. Specifically, I will discuss the faulty methodology and assumptions that Verizon used to create their model, and explain the major differences between the AT&T NRCM 2.2 and Verizon's NRC Model.

AT&T Communications of NJ, L.P. ("AT&T") cannot overemphasize the importance of appropriate non-recurring charges ("NRCs") in the fledgling competitive local exchange service market in New Jersey. If NRCs are too high, Competitive Local Exchange Carriers ("CLECs") may be deterred from entering the market altogether. Inflated NRCs are textbook barriers to competitive entry. Even if CLECs obtain appropriate Unbundled Network Element ("UNE") rates,

wholesale discounts, and collocation terms and conditions, overstated NRCs will immediately undo everything else the Board does to encourage competition. As the FCC put it, NRCs must be set to "ensure that incumbent LECs do not recover nonrecurring costs twice and that nonrecurring charges are imposed equitably."[1]

Verizon's NRCM violates the principles that the FCC articulated by:

- treating recurring costs as non-recurring;
- assuming out-moded and inefficient technology;
- charging for manual tasks that won't happen; and
- including assumptions that have no purpose other than to inflate rates.

Q. DO YOU HAVE ANY EXHIBITS ATTACHED TO YOUR TESTIMONY AND WHAT ARE THEIR SIGNIFICANCE?

A. Yes, I have 15 exhibits. The first set (Exhibits RJW 1-6) represents the ILEC's network. I will use these diagrams to explain what work tasks are necessary for determining non-recurring costs. The second set of exhibits (Exhibit RJW 7-10) represents individual workgroup tasks and how Verizon applied them in their NRCM. These exhibits demonstrate the many inconsistencies throughout the Verizon model. I have also included individual element worksheets from both the Bell Atlantic - New Jersey - Wholesale Non-Recurring Costs Model (Verizon NRCM) and AT&T NRCM 2.2 (AT&T NRCM) (Exhibits RJW 11 and 12). I will use these exhibits to compare how each company modeled NRCs. Exhibit 13

[1]FCC's August 8, 1996 Order in CC Docket 96-98 (the "FCC Order") at ¶ 750.

maps one AT&T NRCM element, 2 wire UNE-loop, to its corresponding element in the Verizon model. This exhibit highlights the specific task differences between the models for this one element and effectively illustrates the points made above regarding Verizon's violation of the FCC principles, and its impact on non-recurring charges. Exhibit RJW 14 is a list of tasks that Verizon should have excluded from its NRCM. Finally, Exhibit RJW 15 is a copy of several VNJ responses to AT&T requests in this proceeding.

II. VERIZON IMPROPERLY TREATS RECURRING COSTS AS NONRECURRING.

Q. WHY DO YOU SAY THAT VERIZON IMPROPERLY TREATS RECURRING COSTS AS NRCS?

A. The FCC in their First Report and Order at paragraphs 745-746 gave specific instructions that first, activities should be classified as either recurring or non-recurring and that second, these costs need to be recovered in a manner that reflects the way they are incurred. In other words, it is inappropriate to recover recurring costs through non-recurring charges.[2]

[2] Paragraph 745. ...recurring costs must be recovered through recurring charges, rather than through a nonrecurring charge. A recurring cost is one incurred periodically over time. A LEC may not recover recurring costs such as income taxes, maintenance expenses, and administrative expenses through a nonrecurring charge because these are costs that are incurred in connection with the asset over time. For example, we determine that maintenance expenses relating to the local loop must be recovered through the recurring loop charge, rather than through a nonrecurring charge imposed upon the entrant.

Paragraph 746. We find that recovering a recurring cost through a nonrecurring charge would be unjust and unreasonable because it is unlikely that incumbent LECs will be able to calculate properly the present value of recurring costs.

Throughout its entire nonrecurring cost study, Verizon includes tasks associated with the construction, administration and maintenance of their own network that should have been excluded. Verizon identifies all work activities that occur in the time frame that a given order is processed and includes them as NRCs, even if they are recurring costs such as construction and maintenance. The inclusion of these recurring cost activities does not comply with TELRIC principles and therefore is the first fundamental difference between models.

For example, Verizon treats the placements of the cross-connect at the SAI as an NRC, if it occurs at the time a service order is completed. If the cross-connect is already in place, Verizon does not identify an NRC. However, the cross-connects at the SAI are simply components of the loop, the entire construction of which, including all field cross-connects, is recoverable as a recurring charge.

Verizon states that its TELRIC recurring loop rates provide a complete communications path from the MDF (or similar frame) to the NID. This is important because it establishes that Verizon considers the loop element to be completely assembled in its recurring rate. [3]

[3] AT&T specifically asked what percentage of loops in the cost study that VNJ filed in New Jersey proceedings to establish permanent unbundled element cost and rates provides a *complete communications path* from the central office MDF (or similar frame) to the NID. Verizon's answers state that the recurring cost study "estimates the forward-looking cost from the MDF to the NID, ATT VNJ-123, and "100% of the loops provide a path from the frame to the NID." ATT VNJ-124.

TELRIC principles require that all costs for the construction of the network are accounted for in the recurring rates by E F & I factors, and any maintenance of the network (including the OSS) is accounted for in the maintenance expense. A Field Installation technician may be dispatched to complete the loop connection or to repair a defective loop, but these costs are recoverable as construction and maintenance expense factors in recurring rates. Verizon has incorrectly included these Field Installation activities as costs within their NRCM that would result in double recovery.

To assume, for calculating NRCs, that the network lacks any necessary intermediate connection points between the MDF and the NID (such as the cross-connections at the SAI) or that the databases may need updating, requires an additional assumption that recurring rates do not reflect all the costs to build and maintain the network. Therefore, Verizon has assumed a network to price non-recurring costs different from the network it assumed to price recurring costs.

To correct this problem Verizon needs to classify each task to reflect the way the cost is incurred. In other words, they should have classified each task as either recurring or non-recurring. If the tasks are administrative or support the construction or maintenance of their own network, then they are recurring cost activities and the costs should be excluded from their NRCM. In this way the associated cost of the recurring activities are borne by all that will benefit from those activities. NRCs should include only activities that benefit exclusively the

customer whose order is being filled. Activities that also benefit other customers or improve the network should be recovered as recurring costs.

Exhibit RJW-14 illustrates some of the numerous work activities within Verizon's NRCM that should have been recovered in the recurring rates as expressed in the FCC's First Report & Order at paragraphs 745-746. It is just a sampling of some tasks to illustrate why they should be excluded.

Q. HOW DID VERIZON TREAT FIELD INSTALLATION ACTIVITIES IN THEIR NRCM RELATIVE TO THE NETWORK CONSTRUCT?

Various departments within the ILEC often work with other departments to perform various tasks associated with the construction and maintenance of the network. Often when field technicians are dispatched, they perform activities related to repairing and maintaining the network. Additionally, departments like the MLAC work with field installation technicians to assist them on various network related problems. As Field Technicians address these problems, they may correct the defective pair, or seek assistance of the MLAC to provide alternate facilities.

It is important to establish how Verizon treated these manual activities associated with network related problems. Did they recognize the distinction between network related activities (as a recurring cost) and the activities that only benefit the customer placing the order (as a non-recurring cost)?

Verizon stated in ATT VNJ-144-b: "None of the activities associated with repairing and maintaining the network (M or R accounts) is considered in the Field Technician non-recurring cost development." This appeared to be a proper response because repairing and maintaining the network are recovered in the maintenance expense of the recurring rates.

However, in ATT VNJ-144-c, Verizon stated that the time involved "if a Field Installation technician requires assignment corrections due to defective plant", is considered an NRC. This is inconsistent with the response to ATT VNJ 144-b and is incorrect.

Similarly, corrections to the OSS databases are administrative activities, needed to maintain the network, that Verizon incorrectly captures as NRCs.[4] For example, where a Field Installation technician discovers that facilities assigned on the order do not appear in the terminal as indicated on the order, an activity is required that should not generate a non-recurring cost. In this case, the Field Installation technician informs the MLAC that the information within the OSS was incorrect and that necessitates a new facilities assignment. This activity benefits the ILEC network and facilities and is not an activity that uniquely benefits the CLEC.

[4] ATT VNJ-144-d.

The correction is, in essence, a repair of a network component, in this case, the inventory database. Repairing of the network, *whenever and wherever it is done*, is a network maintenance expense.

Q. WAS THE APPLICATION OF NETWORK RELATED PROBLEMS CONSISTENT THROUGHOUT THE VERIZON NRCM?

A. No. Several related work activities included in the NRCM indicated technicians were working on network related problems. For example, if the service order assignment needed to be changed (pairs swapped) because it was assigned incorrectly, such as being assigned out of the wrong terminal location, Verizon treated this as an NRC.

In addition, Verizon classified OSS database maintenance inconsistently. AT&T asked in VNJ-142-c "if an MLAC employee needs to make corrections to any inventory database that prohibited a CLEC order from flowing through...are these database corrections considered an NRC?" Verizon's answers to VNJ-142-c&f stated, "Yes"; however, they limited their answer to say, "In the event that significant database errors were discovered that would effect the flow-through of future orders, the time spent correcting the databases would be captured as database management time and considered recurring maintenance expense." Thus, Verizon concedes that database management (i.e. correction) is a recurring expense, but apparently quibbles that if the cost is small, it can be arbitrarily shifted to NRCs.

The assumption that database errors must be "significant" to be considered as maintenance cost is an incorrect assumption. I have personally seen when a ***single database error*** resulted in more than 200 orders being assigned incorrectly. The example involved a new office building and the address in the database that pointed to an adjacent building (that was the wrong location). A construction trailer was using temporary facilities while the new building was being erected. Telephone service was established for the trailer that had the same address as the new office building. When the OSS processed the 200 service orders for the new residents of the office building, they all were assigned out of the adjacent building because the address information in OSS was wrong. Unfortunately, no errors were ever detected by the OSS, because the adjacent building had enough facilities to meet the demand. It was only after the technician was dispatched that the error was detected[5]. Thus, a single database error had ultimately caused the failure of more than 200 orders.

Any and all database updates must be considered as database maintenance activities, and as such should be eliminated in the NRCM.

III. VERIZON ASSUMES OUTMODED AND INEFFICIENT NETWORK TECHNOLOGY IN ITS NRCM.

[5] This scenario represented the activities associated with the LEC retail order. However, it demonstrates a single database error, the terminal address pointer in the OSS, caused 200 orders to be assigned incorrectly and required the MLAC to make new assignments. Additionally, the change of assignments also resulted in 200 new wiring instructions for the CO Frame, and some number of translations changes for the RCMAC.

Q WHAT IS THE IMPORTANCE OF UNDERSTANDING VERIZON'S NRCM NETWORK CONSTRUCT?

A. The network construct is extremely important. First, it should allow interconnection processes that reflect efficient methodologies and technology. Second, the processes for interconnection must be at parity with the processes for services that they would deliver to their own customers. If they are not at parity, then the CLEC would be paying more than their fair share.

Q. DID VERIZON PROVIDE A REPRESENTATION OF HOW THEIR NRCM NETWORK WAS CONSTRUCTED?

A. Yes, somewhat. Verizon responded in ATT VNJ-122 that the network assumed in the non-recurring cost model was the same as that assumed in the recurring cost model. Although a network schematic was not provided, I was able to reconstruct a high level view of the network from the information supplied in the Affidavit of Marsha S. Prosini, and from Outside Plant Engineering Guidelines obtained in VNJ's response to data request ATT VNJ-4.

Exhibit RJW-1 represents an overview of the network that can be used to explain the interconnection of a majority of elements offered by Verizon. From this exhibit, one can determine what network components are necessary in provisioning both wholesale and retail services. For example, Exhibit RJW-2 is an overview of the components necessary to provision customers with a switched (POTS type) service.

The path from the customer's NID to the Local Digital Switch (LDS) is accomplished either through copper or fiber feeder. When copper feeder is used, the analog switch port (representing the office equipment) is cross-connected to the MDF cable and pair (representing the customer's loop) and travels over copper feeder cables to the serving area interface (SAI). At the SAI, the feeder cable is connected to distribution cable that terminates at the customer's NID.

When fiber feeder is used, the customer's digital switch port travels as a DS0 channel over a DS1 through the fiber network to the remote terminal. There, the IDLC equipment produces a derived copper facility that is connected at the SAI. At the SAI, the feeder cable is connected to distribution cable that terminates at the customer's NID. This is referred to as Integrated Digital Loop Carrier (IDLC), where the electronic equipment in the remote terminal talks directly to the switch.

Q. CAN YOU EXPLAIN HOW VERIZON WENT ABOUT IDENTIFYING THE TASKS OF EACH WORKGROUP?

A. Verizon's approach, as explained in the Affidavit of Bruce Meacham, was to identify all elements they intend to offer to the CLEC as UNEs. For each UNE they determined functions associated with providing that element. Verizon next identified workgroup tasks associated with these functions and conducted a Work-Time Survey instructing participants to "estimate the actual time it **does** take to perform the activity in its entirety, not the time that it **should** take." These work-

time surveys were then analyzed and adjusted to incorporate "anticipated mechanization, and process improvements specifically related to each activity/UNE combination to determine the forward-looking adjustment factor for that combination."

The major fundamental flaw with this methodology is that it ignores basic TELRIC principles directed by the FCC at paragraph 685[6]. Specifically, the FCC has instructed that prices should be reflective of "most efficient technology". In other words, the NRCM must represent manual activities on how much time it **should** take with efficient technology, not the time it **does** take with existing embedded technology.

This was not the case with Verizon's NRCM. They were not given this instruction and therefore, the time estimates reflected in their Time-Study reflect the existing network construct. This is evident by the use of Copper/Universal Digital Loop Carrier ("UDLC") vs. Integrated Digital Loop Carrier ("IDLC"). UDLC is by no means a forward looking technology. Any ILEC that reconstructed their network would not install UDLC when IDLC is available. Without Verizon giving specific instructions as to using the most efficient technology network, activity times will

[6] Paragraph 685. Under the third approach, prices for interconnection and access to unbundled elements would be developed from a forward-looking economic cost methodology based on the most efficient technology deployed in the incumbent LEC's current wire center locations. This approach mitigates incumbent LECs' concerns that a forward-looking pricing methodology ignores existing network design, while basing prices on efficient, new technology that is compatible with the existing infrastructure. This benchmark of forward-looking cost and existing network design most closely represents the incremental costs that incumbents actually expect to incur in making network elements available to new entrants.

not be reflective of a forward looking network. Although Verizon asserts that its subject matter experts updated their activity time estimates to reflect forward looking technology, the results do not indicate that this effort was successful.

Q. WHY DO YOU STATE THAT VERIZON'S NETWORK ASSUMES OUT-MODED AND INEFFICIENT TECHNOLOGY?

A. Verizon describes the network used to determine non-recurring loop rates as follows: "For Individual unbundled loops below the DS1 rate, the Verizon NJ loop feeder network for recurring loop rates was assumed to be 50% copper, 40% universal Digital Loop Carrier, and 10% integrated Digital Loop Carrier."[7] Additionally Verizon stated in the same data response that the Digital Loop Carrier in the Verizon NJ NRCM is based on Alcatel's Litespan product. This product was configured as both universal Digital Loop Carrier and integrated (GR303) Digital Loop Carrier.

Thus, the Fiber/Copper feeder ratio is 50%. This means 50% of all loops will originate on the MDF and the remainder of loops will travel over fiber optic cables to remote terminals to the Alcatel's Litespan product.

In addition, the forward-looking end office switching costs are based on 100% digital switching with a forward-looking mix of technologies (5ESS: 74.24%, DMS: 18.56%, ESWD: 7.21%).[8] This is significant because the most economical

[7] Data request ATT VNJ-121-a.
[8] Affidavit of Marsha S. Prosini.

means of delivering telephone services to Verizon's customers when 100% digital switching is available would be via Integrated Digital Loop Carrier[9].

In contrast, Universal Digital Loop Carrier (UDLC) is 1970's technology. At that time it was deployed by the telephone companies to serve additional demand and provide loops to customers who were located quite a distance from the central office.

During the 1970's, the remote terminal DLC equipment converted analog signals from the customer's telephone set to digital signals that traveled over facilities to the central office DLC equipment. At this point it was converted back over to analog and had an appearance on the MDF. The reason for conversion was because switches at this time were also analog, and the office equipment had an appearance on the MDF. Therefore, at the MDF the telephone company would connect the DLC cable pair to the office equipment, thus giving the customer service.

When digital switches became available, it was not necessary to convert DLC back to analog at the central office. The remote DLC could be directly integrated into the digital switch. The switches and remote terminals both spoke this new digital language. This also permitted elimination of costly central office DLC equipment.

[9] This application of UDLC in Verizon's network **is not forward looking**. All services Verizon provides to its customers (including POTS, ISDN and switched specials) can be provisioned via the IDLC (GR-303) interface. **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]**

The IDLC significantly improved the quality of service, because it eliminated the cumbersome "analog to digital and back to analog" conversion that seriously impairs the quality of service, particularly if a customer is using dial-up modems and connecting to the Internet.

It appears that Verizon has modeled its cost studies in this way is to reflect the actual embedded DLC and anticipated growth for New Jersey[10]. Secondly, I believe Verizon intends only to use UDLC for unbundled fiber loops, and has chosen this methodology to reflect the highest possible NRC cost because of the additional manual central office MDF wiring requirement. This is an out-moded and inefficient technology. A prime example of the costly effect of this on NRCs is the inefficient migration process Verizon would employ for customers currently served by fiber feeders. I will discuss this in the next section on migration.

The failure to make proper assumptions as to a forward looking network has other ramifications, such as the cost of loop conditioning. AT&T and Verizon agree that the recurring rates reflect the costs associated with a reconstructed network. Verizon's own loop cost studies are not based on the "actual" loops used by competitors, but the forward looking cost of constructing new loops. Construction of a new loop does not include load coils or bridge taps. Thus, the cost of UNE loops reflects a "clean loop." Therefore, to recover as NRCs the

[10] Affidavit of Marsha S. Prosini, at 18. "The technology mix for both the loop and switching has been updated to include the use of 10% GR303, that represents the future anticipated deployment of GR 303 in BA-NJ's service territory."

costs associated with loop conditioning such elements as "Aerial Bridged Tap Removal - One Occurrence, Aerial Bridged Tap Removal - Multiple Occurrence, Aerial Load Coil Removal - 21K Ft, etc." is not consistent with TELRIC cost principles.

In fact, Verizon includes costs in its recurring cost model to ensure that the loop design specifications provide fully functional loops throughout the service territory without needing load coils or producing bridged taps. Having paid for "clean loops" in recurring rates, CLECs should not also have to pay NRCs to clean up Verizon's existing embedded loop plant. This is another example of Verizon adding improper NRCs by assuming backward looking network components in their NRCM.

In addition, the "un-loading" activity is a network maintenance activity. It produces clean useable loops for specific elements that all users of the network will benefit from; thus it is a recurring cost activity. Verizon will have access to these loops for their own retail services when the CLEC services are disconnected. In other words, Verizon may not have to perform similar tasks to serve their own future customers.

These loop conditioning elements offered as NRCs by Verizon amount to nothing less than another windfall for Verizon. They first would recover all of the costs to

address the *Total Demand* through the recurring rates and then recover the same tasks again through NRCs.

IV. THE MIGRATION PROCESS DEPICTED BY VERIZON DEMONSTRATES THE FLAWS OF THE NRCM.

Q. CAN YOU PLEASE ADDRESS HOW VERIZON INTENDS TO TREAT CUSTOMERS MIGRATING THEIR SERVICES TO THE CLEC?

A. The migration process should reflect an efficient cost- effective method of interconnection. To the end user customer, the process should represent uninterrupted service conversion where they change their local provider seamlessly. The process depicted in Verizon's cost worksheets doesn't reflect a seamless process; instead it reflects an intensely cost- prohibitive process, where the ILEC includes many inefficient and redundant time- consuming manual tasks.

The migration process depicted in Verizon's NRCM includes assumptions that have no purpose other than to inflate its claimed NRC costs; it charges for manual tasks that are not necessary; and it includes charges that are premised on sheer fantasy.

Basically, there are three fundamental flaws with the NRC rate development for hotcuts.

1. The process for migrating customers served by the 50% of the network on copper feeder is modeled with unnecessary handholding and oversight by the RCCC.
2. Verizon's "IDLC to Copper HotCut" rate development suggests they intend to treat IDLC loops differently, by migrating the customer's loop to analog facilities at time of conversion. The conversion is accomplished by converting the IDLC fiber feeder loop to UDLC facilities appearing at the MDF. This type of conversion is completely unnecessary in the forward-looking network, and has no purpose other than to inflate its claimed NRC costs. Given that 50% of the network consists of fiber feeder with 100% digital switching, a forward looking model would assume that 50% of the migrations could be accomplished over an electronic IDLC (GR303) interface.
3. The NRC rate application to the Two Wire Loop used a melded cost reflecting both IDLC and Analog loops. It represents a recurring cost network (that Verizon claims) is 50% copper, 40% UDLC, and 10 IDLC (GR-303). This recognition supports AT&T's assumption that the ILEC can effectively deliver unbundled loops over an IDLC (GR303) interface. In contrast, Verizon's Hotcut rates do not reflect this same mix. They have developed a Two Wire Hotcut Initial (and Additional) that clearly indicates 100% analog connections at the MDF. These don't reflect the same network mix as indicated in the 2 Wire Loop. Since the Hotcut order will produce an unbundled 2 wire loop, they should have conformed to the same rate approach as they did for the Two Wire Initial. In other words, the Verizon cost model should have included, at a

minimum, a melding reflecting its own 90%-10% network mix. Moreover, a forward looking model would reflect a 50%-50% mix.

To clarify these points, I have included a series of Exhibits that help depict the various scenarios. First, I will address migration of a customer currently on copper feeder facilities, identified on Verizon worksheet #3, "2 Wire Hotcut Initial." Then, I will address customers on fiber feeder (IDLC), for which Verizon unnecessarily complicates the migration by moving that customer from their fiber (IDLC) facilities to copper feeder facilities, represented by worksheet# 5, "IDLC to Copper HotCut Initial."

Q. CAN YOU EXPLAIN PROBLEMS YOU IDENTIFIED WITH VERIZON'S 2 WIRE HOTCUT?

A. When service orders are issued to migrate customers who exist on analog facilities, Verizon migration (hotcut) worksheet #3 applies. The process involves continuous hand holding by the RCCC/RCMC, that is unnecessary. **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]**[11] Verizon's NRCM also indicates that not all tasks will be necessary all the time, and currently only assesses **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes of labor to the entire process[12]. Forward looking adjustments reduce the total slightly to **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes of

[11] This is the total labor identified assuming all tasks need to be provided for a 2 wire Hotcut initial.
[12] The time estimate was obtained by combining "connect times" with the "connect typical occurrence" factors, and summing the total.

labor, with the bulk of the time being saved in the service ordering process. This process is not reflective of an efficient telecommunications provider.

Q CAN YOU EXPLAIN WHAT THE MIGRATION OR HOTCUT PROCESS WOULD BE FOR AN END USER CUSTOMER ON COPPER OR ANALOG FACILITIES?

A. In summary, the process involves terminating the CLEC service provided over cross-wire at the MDF between the cable pair and the ILEC Port by placing a new cross-connect to the new CLEC equipment. On the Due Date and at the Due Time, the ILEC OSS releases translations into their switch to effectively "turn-off" the ILEC dial tone. If necessary, the ILEC OSS points the telephone number to the CLEC switch for local number portability. At approximately the same time, or shortly thereafter, the CLEC OSS releases translations into their switch to "turn-on" their dial tone. If both companies act in a responsible manner, by doing as indicated on the order, the end user customer will be migrated seamlessly and without much manual labor.

Q. IS THIS THE SAME HOTCUT PROCESS THAT VERIZON HAS IDENTIFIED?

A. The end result is the same but the process is not. Verizon's process is more labor intensive and unnecessarily controlled by the RCCC/RCMC. After the CLEC has performed its pre-ordering, ordering, and provisioning steps as described above for the 2 Wire Loop, Verizon diverts activation of the UNE to the control of the RCCC/RCMC.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] The combined time for these initial **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** events is **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes of which Verizon shows only 30.28 minutes are necessary today[13]. Verizon's forward looking factors reduce the applied time down to **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** Verizon does not indicate whether the reductions are due to process improvements resulting in less time, or not having to use this task in the forward looking model.

Next, Verizon asserts that for every order, the (RCCC/RCMC) will take an average **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes to contact the CLEC and ask them if they really meant to do the work (Task #18, Contact CLEC to verify activity). This is ridiculous. The order itself represents their commitment to do the work.

Next, Verizon identifies **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes to schedule work-teams . This makes no sense, because scheduling is, or should be, done by the Work Force Administration (WFA) OSS that is programmed specifically for that task.

[13] The **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minute time estimate was obtained by combining "connect times" with the "connect typical occurrence" factors, and summing the total.

Verizon has the **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]**, when the communications should be automated. This inefficient sequence also appears as **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** additional minutes in CO Frame and RCMAC tasks #1''. CO Frame task# 1 is also redundant because the CO Frame technician already knows (by a pending orders list) that there is a pending order in their OSS.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] Again, Verizon's tasks reflect the inefficiencies of not using the OSS as they were designed to be used. Expending RCCC labor time to duplicate automated OSS instructions defeats the purpose of automated OSS-efficiency and cost savings.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] Essentially, the purpose of this function for Verizon is "Let's see if our own records are right". This **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes of labor has no purpose other than to inflate its claimed NRC costs.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] is extremely alarming because one would not expect the CLEC dial-tone to be present unless the due-date and due time have already passed. This task indicates that Verizon anticipates missing the target time on which the CLEC has requested that the service be migrated.

The problem with Verizon's hot cut process is reflected in CO Frame task #10 that states **[BEGIN VNJ PROPRIETARY [END VNJ PROPRIETARY]** This is completely unnecessary. The CO Frame technician can (ahead of scheduled due date and due time) terminate the cross-connections at the CLEC equipment to the cable and pair without affecting the working service. The cable pair is double tapped going to both the ILEC port and the CLEC equipment (port). If the service order says the due time is 10:00 am, it is expected that the ILEC's OSS would release the translation message at that time to the ILEC's switch, thus terminating their service. The CLEC's OSS will then release its translation message to activate their service as scheduled, thus migrating the customer without the need of constant monitoring by the RCCC.

This process is not "Pie in the Sky", nor is it new to Verizon. A similar process has been used for years to migrate thousands of customers in a matter of seconds from one switch to another during switch cut-over conversions. The new switch office equipment is cross-wired to existing cable pairs and translations are programmed in the switch. On the night of the conversion, instructions are sent to the old (disconnecting) switch to terminate (shut-down) service in that switch. Within a few seconds, a similar instruction is sent to the new switch to turn-on translations. This allows everyone in the old switch to be migrated to the new switch. While I was in NYNEX, I was personally involved with many switch conversions as an ESS Conversion supervisor. Verizon should have modeled their Hotcut process like their switch conversion process, but they did not. Instead they modeled an

unnecessarily labor intensive process, that has the effect of driving up NRCs unnecessarily.

A number of other CO Frame tasks would be eliminated if Verizon adopted the efficient hot cut process I described, including **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** Verizon has also included, with tasks #17 & #18, a total of **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** minutes of labor for field installation technicians when in fact no field Installation work is necessary. For the "2 Wire Hotcut initial" it is assumed that the existing loop will be reused.

Q. YOU INDICATED THAT VERIZON HAS A DIFFERENT PROCESS FOR MIGRATING POTS CUSTOMERS WHEN THEY ARE ON IDLC. CAN YOU EXPLAIN THE DIFFERENCES?

A. Most notable about Verizon's "Cost Summary Worksheet" is that there is no NRC rate associated with the migration process where the customer remains on IDLC fiber feeder and that customer is electronically migrated to the CLEC digital facilities. There is no technical limitation as to why this type of migration cannot happen. Therefore, there is no valid reason why Verizon should exclude it from their cost summary. However, they do have a charge for "Per DSO Channel" that represents the necessary electronic connections of the digital network that could almost be used as a proxy to discuss the events that are necessary.

It appears from worksheet #5 in Verizon's NRCM ("IDLC to Copper Hotcut Initial") that they have priced the tasks necessary when the migrating customer is on IDLC and Verizon claims that facilities need to be changed over to analog UDLC (like copper).[14] Using Exhibit RJW-1, the customer whose ILEC service is on an IDLC loop is digitally connected to the IDLC equipment at the remote terminal. The migration process would involve an electronic cross-connect instruction to effectively move the customer's IDLC channel to the CLEC's digital facilities. It does not require any manual activities by the CO Frame technicians **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** Therefore the NRC rate application of 2 Wire hotcut is completely inconsistent with their own rate development construct. This is another reason to reject it in its entirety.

At a minimum, Verizon should have applied **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** from their NRCM Worksheet #5 plus **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** from worksheet # 52 to determine the cost for 2 Wire hotcuts as they applied this same melding in their 2 Wire loop rate. The melding ratio used by Verizon assumes the outmoded UDLC technology for 40% of the network.

[14] AT&T disagrees with Verizon's approach to modeling NRC costs for the "IDLC to Copper HotCut Initial" and "IDLC to Copper HotCut additional" based on the fact that it does not represent efficiencies found in the forward looking network construct. However, AT&T recognizes that Verizon has modeled this element on what they expect the CLEC will order. If the CLEC so chooses to instruct Verizon to place an order with instructions to connect the loop to an analog CFA, then this element would apply. Likewise, Verizon should have also modeled NRC costs for when the CLEC places an order with instructions to connect the loop to a digital CFA (e.g., CLEC's DS1).

Correcting this assumption to accept the more efficient configuration of 50% copper, 50% IDLC, would generate a more accurate melded rate.[15]

Q. LOOKING AT VERIZON'S NRCM, WORKSHEET 84, IDLC TWO WIRE NEW INITIAL, IS THIS A REPRESENTATION OF AN IDLC LOOP AND COULD THIS BE USED AS A PROXY FOR DETERMINING MIGRATION COSTS?

A. Yes. Worksheet 84 represents a process using IDLC technology to electronically cross-connect ILEC unbundled loops with CLEC interconnection facilities, that would be efficient if properly done. Exhibit RJW-3 demonstrates that the customer's loop originates at the NID and is connected through the SAI to a pair produced by the IDLC equipment at the remote terminal. From this point, it is electronically converted to a DS0 channel on a DS1 running into the central office equipment. Here it is electronically cross-connected to the CLEC's DS1 interconnection facilities.

Verizon's recognition of this process is significant[16]; however, it has loaded up the process with unnecessary tasks and work times. **[BEGIN VNJ**

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[15] Verizon's melded approach to modeling NRC costs for the "Two Wire New Initial" and "Two Wire New Additional" reflects the mix of copper/UDLC to Fiber IDLC (GR303). It is technically feasible to apply this mix to all loop elements Verizon offers. To be consistent, Verizon should have also assumed the same approach when modeling NRC costs (e.g., "Four Wire New Initial", "Four Wire New Additional", etc.)

[16] Verizon has used this worksheet to develop a melded price for the unbundled loop. This is evident by the cost calculations on their "Cost Summary Worksheet." To determine the cost of a 2 Wire loop initial they have applied **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the cost from the 2 Wire loop and **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the IDLC Two Wire New Initial. This is significant because it recognizes that it is technically feasible to interconnect 2 & 4 wire IDLC loops to the CLEC. Therefore, Verizon must concede that it is technically feasible to migrate any customer on IDLC loop to the CLEC. Consequently, when they developed the cost of the 2 & 4 wire Hotcut, they should have included the same application of

PROPRIETARY] [END VNJ PROPRIETARY] As I have already expressed throughout this testimony, the specific tasks are unnecessary and the work times are excessive.

Q. CAN YOU ELABORATE ON VERIZON'S "PER DS0 CHANNEL" WORKSHEET AND PROCESS?

A. Yes. The "Per DS0 Channel" (worksheet #52) represents a request from a CLEC for an Unbundled IDLC DS0 line port. From the worksheet, the involved workgroups are TISOC, RCCC/RCMC and RCMAC. This indicates to me that the CLEC would place a service order indicating they want an unbundled DS0 channel to the ILEC switch. EXHIBIT RJW-6 represents the work that is involved with this element once the UNE has been ordered. The UNE itself represents a DS0 path between the ILEC's switch (port) and the CLEC's DS1 equipment. Electronic cross-connections made by the ILEC's OSS will facilitate the connection between the ILEC and CLEC equipment. Additionally the ILEC OSS will send translation messages to the switch to activate the service.

Looking at the tasks Verizon has identified on their worksheet, the RCCC/RCMC is again controlling the process. I have the same concerns about this unnecessary workgroup interaction as I have discussed throughout my testimony. The RCCC/RCMC involvement is unnecessary.

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percentages as they did for the 2 wire loop. They did not. The reasons why they did not include the same percentages are unclear, except for the fact that they themselves wanted to reflect the highest possible cost

The RCMAC workgroup task #2 indicates manual activity required **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the time (this would be in the form of service order fallout). This also indicates the OSS will be delivering error free translation messages **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the time. However, the time indicated to create these translation messages is extremely high. While I was an employee of NYNEX, I was personally responsible for creating similar types of translation messages as an ESS Conversion Station Assigner and I observed hundreds of messages as a Supervisor. This task should take no more than 5-10 minutes per basic POTS message.

Even more cryptic is the task itself to **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** If this element is for a NEW Initial request (and I suspect that it is from TISOC Task #1), the wording should be changed to reflect just that. If the service is working already, the service request would only be to change features, and this is priced on worksheet # 28. Therefore, this task (RCMAC Task #2) again is unnecessary.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] appears to be purely a maintenance type of request. This should have been classified as a maintenance task recoverable only as a recurring cost, and not as an NRC.

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to deter new entrants from entering the marketplace.

Q. ARE THERE PROBLEMS WITH OTHER TASKS OR WORK TIMES VERIZON HAS IDENTIFIED?

A. Yes. There are far too many to list in this testimony. Generally speaking, the tasks reflected on the worksheets for each element need to pass a reasonability test.

I have attached the following EXHIBITS RJW 7-10 to illustrate the problems I found with Verizon's NRCM.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] Although this task reflects inefficient administrative and redundant activity, because the CO FRAME gets notified by ILEC's OSS, Verizon has only applied this task **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** The problem with this is that there is no such element as a **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** The hotcut order simply produces a 2 wire loop element. Once the 2 wire loop is migrated (via the hot cut order) it becomes a 2 wire loop, and any disconnect activity time (for a task such as this) should only be applied to the 2 wire loop element. Recovering this cost again on hot cut orders is nothing more than a double recovery.

Another illogical aspect of this same task is how Verizon only applied it to the **[BEGIN VNJ PROPRIETARY [END VNJ PROPRIETARY]** However, in the disconnect column, they claim **[BEGIN VNJ PROPRIETARY] [END VNJ**

PROPRIETARY] This is additional evidence of the unreliability of the Verizon NRCM.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] has many of the same problems previously mentioned. **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** I agree in part it will be necessary to **[BEGIN VNJ PROPRIETARY [END VNJ PROPRIETARY]** is another redundant sub-task that is meaningless.

Looking at task #2 in greater detail, it again indicates some unusual characteristics. Verizon claims task #2 is necessary on **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** As I previously stated, there is no such element as a "*2 wire loop Hotcut.*" Hotcuts are a service order type. The service order simply creates a 2 wire loop. Therefore, if this task is necessary when disconnecting a 2 wire loop, it should be recovered on that element. Verizon's application of cost recovery is to collect both the "connect" and "disconnect" costs together. By Verizon's method, when you order a *2 wire Hotcut initial* you should also pay for the disconnect of a 2 wire loop. Therefore to properly reflect the "disconnect" cost on the hotcut order, the tasks necessary to "disconnect" a *2 wire Initial* should be exactly the same as the tasks necessary to disconnect a *2 wire Hotcut initial*, but they are not. Again, this inconsistency indicates unreliability of the Verizon NRC model.

Verizon's application of the probability percentage of this task is also baffling. For the 2 wire loop initial, it is required **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the time. This is correct because the technician must retrieve and verify information for each element that is ordered. However, when "additional" 2 wire loops are ordered on the same request, (indicated by the 2 wire loop additional), the task itself is only required **[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY]** of the time and it takes considerably less time. This doesn't make sense because it should be the same activity and time for each and every (like) element on the request. These tasks should represent the time necessary to retrieve the order from the OSS to verify the information on an element by element basis.

[BEGIN VNJ PROPRIETARY] [END VNJ PROPRIETARY] The most obvious problem with this task is the assumption that technicians are dispatched to remote offices to work on only one order. This assumption is outright wrong. Having worked for an ILEC (NYNEX) with many remote (unmanned) central offices, I know technicians are dispatched with several orders or maintenance tasks combined or are dispatched for a specific period of time, such as a 2-4 hour time slot. In this way, they are available to perform both maintenance and service order-related tasks. There is no indication that this travel time is divided by the number of tasks that they perform while they are at the unmanned central office. To properly recover the travel time for each order, it must be divided by the number of tasks that the CO technician performs while at that location.

A second problem is the amount of travel time itself. It should reflect an average time for all order/element types. It is comical to think that when a technician travels to an unmanned office to work on a 2 wire loop order, he travels at a faster rate than he would if he was working on DS1 Interoffice facility order. Furthermore, when you look at the time difference between "connect" and "disconnect" orders, strikingly enough, there is another inexplicable assumption. Verizon posits more travel time to disconnect an UNE than it does to connect a UNE. Something is obviously wrong with this picture, and it presents yet another example of unreliability in the Verizon model.

Q. THROUGHOUT YOUR TESTIMONY YOU HAVE INDICATED THAT THE RCCC/RCMC WORK CENTER TASKS ARE UNNECESSARY IN AN EFFICIENT WORK FLOW PROCESS. ARE THERE ANY INSTANCES WHERE THEIR TASKS MAY BE REQUIRED?

A. No. From the tasks indicated, the work performed by this workgroup appears to be purely administrative. Their tasks amount to one workgroup who contacts another workgroup to inform them that they have some work to do. It's just another layer of costs that are not needed in an efficient workflow process.

Q. CAN YOU PLEASE PROVIDE EXAMPLES OF HOW VERIZON DID NOT PROVIDE REASONABLE PROOF OF THEIR CLAIMED COSTS?

A. Yes, for instance there is no backup data of the TISOC workgroup that supports the exceedingly high manual labor times due to CLEC LSR fallout. AT&T asked Verizon if they could supply examples of service order errors, their causes, and

reasons why errors could not be eliminated[17]. Verizon's response stated, in essence, that Anderson Consulting conducted a Time & Motion study and there were "no errors" identified in the study[18]. They did produce copies of actual service order errors that would demonstrate the steps necessary to address them.

Answers to ATT VNJ-136 did reflect the types of fallout encountered by the TISOC workgroup. However, this was inconsistent with the task description. Verizon claims the TISOC should be reimbursed for the time necessary to receive the request, print and resolve the error, then type it manually into their OSS[19]. TISOC Task #1 & #2 did not represent the necessary steps to resolve the errors indicated in response to ATT VNJ-136. Every type of error condition indicated by this response should result simply in the action necessary to return the order to the originator i.e., the CLEC, for correction. The TISOC workgroup doesn't correct the errors themselves, but needs only to return the order with the appropriate error condition back to the CLEC.

The OSS that detected the error in the first place should not be automatically programmed to re-direct the order back to the CLEC. Examples of errors listed in the reply were:

1. An invalid LSR field has been populated.
2. An LSR field contains invalid data.

[17] ATT VNJ-142-a-g.
[18] ATT VNJ-142-b,c,d.
[19] Verizon's NRCM TISOC Task # 1, Receive Local Service Request (LSR) from the CLEC and print,

3. The address populated on the LSR does not match the address in "LiveWire".

4. A required field has not been populated.

5. The FEATURE Field contains invalid data.

6. A required form has not been submitted.

7. A supplemental service order has been sent on an LSR when the service order has already been completed.

8. A Verizon NJ Technician was unable to obtain access to the end-user customer's premises[20].

9. The LOOP is not qualified as requested (e.g. loop length too long, loaded facilities, no copper facilities available, spectrum incompatibility issues)[21].

10. The retail service or line cannot be migrated (e.g., BOSS/CRISS account is not live).

11. A problem with the telephone number provided (e.g. incorrect Area Code, incorrect Wire Center, no account found, no match to end-user name, no match to end user address, status is non working, status is disconnected).

---

review, type and confirm the order request for new installation and/or account.

[20] This type of condition would never originate from the CLEC LSR. It represents a failure to complete a requested task, and would be generated from Field Installation technicians, not the TISOC.

[21] TELRIC principles suggest all demand is accounted for in the recurring rates. In other words, the facilities are located where the demand is needed, and the design and construction of that plant meets the required conditions of the elements themselves. Here, Verizon is seeking additional monies for conditioning their plant. Any modifications to the plant would be Maintenance activities, and thus should be excluded from NRCs.

12. Due date is in jeopardy due to facilities (e.g. facility problems, no spare facilities, no copper facilities available)[22].

13. Duplicate Purchase Order Number (i.e., a new PON has been received and the identical work being requested on the new PON is pending or completed by another PON).

14. A pending order exists on the same account in which the LSR is requesting activity.

Q. WERE THERE ANY ADDITIONAL PROBLEMS WITH THE ACTIVITIES OF THE TISOC?

A. Yes. Verizon provided the functional descriptions of each of their workgroups in Exhibit C of the Bruce Meacham Affidavit. One troubling section read; "It is anticipated that in the future, the CLEC will submit the majority of service orders through an electronic interface and will not require manual intervention from the TISOC. Only complex orders (e.g., those requesting 10 loops or greater) will be unable to flow through the system."

AT&T was able to establish the reason that "complex orders (e.g., those requesting 10 loops or greater) will be unable to flow through the system" was not a system limitation, but instead a parameter established in order to accommodate field surveys. Under this scenario, Verizon would be reimbursed under its NRC model for checking its own inventory!

[22] This is an error condition detected by the MLAC Assignment OSS (LFACS). The TISOC doesn't detect this type of error. It results from no available inventory and according to Verizon's answer to ATT VNJ-

In response to AT&T-VNJ 137-a, Verizon stated that "the need for field inventory is planned, and is neither a restriction of the operating systems nor a limitation to VNJ's sophistication. Rather, it is an established procedure designed to assure CLEC customers that local facilities are available to meet their demand." It is, therefore, an administrative activity to maintain the network and not recoverable as an NRC.

Verizon concedes in its answer to ATT VNJ-137-e "there are no cost or charges for performing field surveys assessed to the CLEC." To be consistent, this administrative rule should be associated with the field survey activity it facilitates and should be eliminated from Verizon's claimed NRC Cost.

Q. IF WE WERE TO COMPARE THE AT&T NRCM TO THE VERIZON NRCM SHOULDN'T WE EXPECT TO SEE SIMILAR TASKS FOR THE SAME ELEMENT TYPES?

A. Yes. However when you compare the models "side-by-side" what is most obvious are the additional unnecessary tasks Verizon seeks recovery for. Verizon has represented a process that is plagued by inefficiencies and meaningless tasks. I have provided EXHIBIT RJW 13 to illustrate a side-by-side comparison of the process tasks AT&T and Verizon identify when processing CLEC requests for the 2 Wire UNE-LOOP element.

V. CONCLUSION.

142-h when facilities are unavailable, the resolution time is not considered an NRC.

Q. CAN YOU SUMMARIZE YOUR CONCLUSIONS?

A. Yes. The Verizon NRCM should be rejected because it does not generate appropriate efficient nonrecurring prices. The faulty methodology and outmoded network assumptions in the Verizon NRCM result in prices so excessive that, if adopted, they will create a barrier to competitive entry. By capturing recurring cost activities, such as construction and maintenance as NRCs, Verizon's model would accomplish two significant anticompetitive effects – double recovery and excessive up front per order costs to CLECs. By excluding efficient network technology, such as IDLC over UDLC, Verizon incorrectly adds significant manual labor costs to its NRCs. In addition, many of the individual tasks identified by Verizon are unnecessary makework. Finally, even for those tasks that are justified, Verizon frequently overestimates the time required to complete them. For these reasons, AT&T recommends that the Board reject the Verizon NRCM and adopt the NRCs generated by the AT&T NRCM presented with my Direct Testimony.

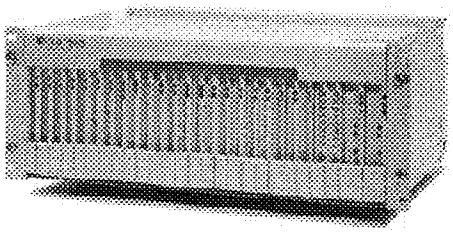
Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

WALSH EXHIBIT 2

MCI WORLDCOM
Law and Public Policy

Unbundling Digital Loop Carriers



March 1999

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I. INTRODUCTION

The purposes of this paper are to show:

- that Integrated Digital Loop Carriers (IDLCs) can be unbundled;
- that there are four technically feasible ways of unbundling IDLCs with equipment that is in-place or generally available today;
- that CLECs can access their IDLC served customers' signals in a digital format *without* collocation; and
- that converting an IDLC-served customer to all copper facilities or an older form of DLC is a backward step in technology that actually degrades the customer's service.

Digital Loop Carriers are widely deployed in the telecommunications network in place of expensive copper feeder. In addition to providing a cost-effective alternative to copper feeder in many situations, DLCs can extend potentially distance-restricted services such as ISDN farther away from the central office and can push switch-based functionality farther into the field to remote terminals.

Currently, 20 percent of the access lines in the United States are served by DLCs, and that penetration is projected to increase ultimately to 50 percent in urban areas and 80 percent in rural areas.[1]

DLC technology has been around since the 1970s, but there have been significant advances in the technology over the past two decades. Today there are two major types of DLC – Universal (UDLC), which was developed for an analog environment but can work, albeit inefficiently, in a digital environment, and Integrated (IDLC), which was developed specifically for a digital environment. There have been two "generations" of IDLC technology, which conform to two sets of specifications developed by Bellcore -- TR-008 and GR-303.[2] The Bellcore GR-303-capable IDLCs are the forward-looking technology being deployed today.

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[1] GR-303 technology and its deployment were the topic of Bellcore's GR-303 Integrated Access Symposium, San Diego, CA. July 29-30, 1998. www.bellcore.com/gr/gr303.html#forum.

[2] Some manufacturers have called their GR-303 IDLCs "Next Generation DLCs" (or NGDLCs) for marketing purposes, but these simply represent the manufacturers' latest GR-303-compatible IDLC offerings.

UDLC enters the central office switch in analog form, and therefore requires an analog-to-digital conversion when used with digital switches. By contrast, IDLC stays in digital form as it enters the local digital switch. Today, an incumbent local exchange carrier (ILEC) is unlikely to deploy a UDLC unless an analog switch serves the loop(s).

The notion that IDLC technology cannot be unbundled because it is integrated into the local digital switch is incorrect. As this paper will show, "integrated" does not mean inseparable or incapable of being unbundled. It is technically feasible to unbundle all IDLCs, including TR-008 and GR-303 IDLCs.

While older DLCs were only designed for voice services, the most recent products are designed with broadband applications in mind and can simultaneously support voice as well as advanced technologies such as Digital Subscriber Line (DSL). This paper only focuses on unbundling the voice capabilities of Digital Loop Carriers. Another MCI WorldCom white paper on providing ADSL with a Digital Loop Carrier is under development and will be available shortly.

II. WHY LECs DEPLOY DLCs

A DLC is an electronic device that connects to customers' copper distribution pairs at a remote terminal, converts the analog signals to a digital multiplexed format, and then transports the digital signal over a fiber or copper transport to the local switch in the central office. Figures 1 (a), 1 (b), and 1 (c) show three scenarios that will be described in greater detail in this paper: UDLC connecting to an analog switch such as a Western Electric 1AESS or crossbar; UDLC connecting to a digital switch; and IDLC connecting to a digital switch.

The multiplexing of the copper pairs reduces the number of pairs needed in the feeder portion of the loop plant (or eliminates the need for copper pairs altogether in the feeder network as they are replaced by fiber). Indeed, for that reason, when DLC technology was first introduced it was often referred to as "pair gain" technology. In addition, DLCs are often more economical to deploy for feeder lengths greater than 9,000 feet than are large, expensive copper feeder cables. Companies sometimes perform a cost-benefit analysis to prove in DLCs by comparing the DLC costs to the cost savings from not having to reinforce existing cables or not having to obtain additional room on poles or place additional conduits.

Also, deployment of DLCs in concert with the Carrier Serving Area (CSA) and/or ISDN design criteria developed by the industry, allows a carrier to provide digital services such as ISDN service that cannot otherwise be provided over loops that

exceed 18,000 feet (see Figure 2).[3] In addition, DLCs bring some switch-based functions out to the field. For example, many GR-303-equipped DLCs poll customer lines for an off-hook condition, perform concentration functions, and extend services such as ISDN further out into the central office serving area.

III. UDLC vs. IDLC

The first generation of DLC, now known as UDLC, consists of a remote terminal (RT), a transmission (transport) facility to link the RT to the central office (CO), and a central office terminal (COT). (See Figures 1 (a) and 1 (b).) The RT aggregates the copper pairs and performs conversions -- converting the customer's analog signal to a digital multiplexed format going to the central office, and (in the opposite direction) converting the digital signal from the central office to the customer to an analog signal. The transport carries the digital signal from the RT to the COT, and vice versa. The COT equipment converts the digital signal from the RT to an analog signal before the signal is terminated on the Main Distributing Frame (MDF)[4] and cross-connected to the switch port.

It is at this point that the equipment needed differs depending on whether the CO switch is analog or digital. Where a UDLC is connected to an analog switch (see Figure 1 (a)), after the individual voice-grade analog circuits are terminated on the MDF, they are cross-connected into and out of the switch through an analog line circuit card.

In the case where a UDLC is connected to a digital switch (see Figure 1 (b)), the signal is cross-connected on the MDF to an analog port (called an Analog Interface Unit or AIU) on the switching system. At the AIU, the signal that was converted from digital to analog at the COT is now converted back to digital -- and, in the other direction, the digital signal from the switch is converted to analog before being sent to the COT where it will be converted back to digital.

As digital switches were deployed, the required digital-to-analog conversion at the central office for UDLCs became redundant, inefficient, expensive and degraded voice quality. Thus, the "integrated" DLC was developed and introduced.

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[3] The CSA design copper loop limit is 12,000 feet with limited bridged taps. ISDN design specifies that loops be less than 18,000 feet, non-loaded, and have limited bridged taps (over 24 AWG wire). Both the CSA and ISDN designs enable more efficient and cost effective deployment of DLC technology, make more efficient use of the in-place cables, and reduce ongoing cable reinforcement costs.

[4] The COT equipment also converts the analog signal coming from the switching system to a digital signal to be sent to the RT.

The term "integrated" DLC was coined to differentiate the IDLC from the older UDLC technology. Specifically, it allowed the elimination of the DLC central office terminal, of switch line cards, and of the central office analog-to-digital (A/D) or digital-to-analog (D/A) conversions. In short, the IDLC could be directly connected to the digital switching system. However, this does not mean that the DLC is inseparable, indivisible, or incapable of being unbundled, nor that the service is inseparable from the ILEC switch. As will be described in detail below, an IDLC can be digitally connected to more than one switch simultaneously (this is called Multiple Switch Hosting) by separating and unbundling digitally encoded voice (and data) channels.

As shown in Figure 1 (c), the basic IDLC system consists of an IDLC RT, a digital transmission facility with various pieces of equipment and an Integrated Digital Terminal (IDT) in the switch.

The IDLC RT (see Figure 3) consists of channel units (customer interface cards), power supply, a Time Slot Interchanger (TSI) that assigns loops to time slots, interface groups that aggregate traffic into specific interface formats,[5] and a multiplexer (mux) to consolidate or aggregate the signals for transport to the CO. These main components of an IDLC RT are all contained within a cabinet that ranges from the size of a Network Interface Device (NID), a wall mount, to a large wall-to-wall bookshelf (for example, a Lucent 80D cabinet) depending on the vendor and number of lines served. Currently IDLC RTs can handle from 24 to 2,016 lines. Copper distribution cable, as opposed to coax or fiber, connects the customer to the RT and is still the most economical way to provide basic telephone service.

A digital transport facility connects the RT to the central office.[6] In the digital transport connecting the RT to the central office, various pieces of equipment

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[5] These will be described in greater detail later and are shown in Figure 4.

[6] Early DLC applications used T-1 carrier on copper pairs. In addition to T-1 over copper, both Synchronous (SONET) and asynchronous fiber optic transport are utilized, depending on the application, size, location, and condition of the outside plant. Generally, larger DLC systems transport is on fiber at the SONET OC-3 (155 Mb/s or 84 DS1s or 2,016 DS0s) rate. In addition to OC-3, OC-1, OC-12, and DS-2 over fiber are also common options. SONET technology is preferred and has replaced other transport mediums because it dramatically reduces multiplexer costs and because of its inherent Add-Drop and Ring capabilities. Add-drop capability is the ability to accept or drop-off groups of circuits (virtual tributaries) from the SONET device without any additional multiplexing equipment while simultaneously providing transport to preceding and succeeding SONET muxes. Ring capability is the ability to connect multiple SONET muxes into one of several types of ring topologies such that service is maintained when one "leg" of the (ring topography) transport is severed. This is a common technique used to ensure survivability of the fiber transport.

must be used to de-multiplex (break down) the transport medium into individual DS1s in order to "hand-off" the DS1s to the digital switch. (See Figure 1 (c)). If the transmission medium is fiber, the signal goes through a Light Guide Cross-Connect (LGX),[7] a fiber multiplexer (mux),[8] and a digital signal cross connect (DSX) device. If the transmission medium is copper, the copper first terminates on the MDF (for lightning protection) and is then extended to the DSX. The DSX is similar to a MDF and allows DS1s[9] to be cross-connected to various devices in the CO. For either fiber or copper transport, the signal remains digital and terminates at the Integrated Digital Terminal (IDT) in the digital switch. The IDT is a digital interface component of the local digital switch where the DS1s from the IDLC RT are terminated and includes a Time Slot Interchanger that assigns loops to time slots on a per call basis.

Because of the digital nature of IDLCs, the MDF, which is the traditional demarcation point between the copper loop and the switch, is not the demarcation point for the IDLC-served loop. Instead, an IDLC loop is assigned electronically to time slots at the RT, and the physical demarcation point for an IDLC-served loop is in the CO at the Digital Signal Cross-Connect (DSX). The DSX is a passive electrical patch panel that allows manual cross-connects for DS1 or higher level signals. IDLC loops are transported in groups of up to 24 circuits within each DS1, which is typically terminated and cross-connected at the DSX.

From the DSX, CLECs can take their traffic to their CO over leased or owned transport without having to collocate. This option is particularly attractive to CLECs because collocation is expensive, time-consuming, and often said to be unavailable.

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[7] The Light Guide Cross-Connect is a device upon which the fiber from the outside is terminated and cross-connected with fiber "pigtails" to the fiber mux in the CO. The pigtails are single fibers designed to be inserted into the LGX to mix and match fiber inputs from the outside fiber cables. Essentially, the LGX is a fiber MDF.

[8] The fiber mux or SONET mux is a device that takes (electrical) digital signals (cross-connected via the DSX) and converts them into optical signals or vice-versa. For instance, an OC-3 mux can take a maximum of 84 DS1s and convert them into a single optical bit rate of approximately 155 Mbps with a multiplexing technique called Time Division Multiplexing, hence, the term mux. There are synchronous (SONET) and asynchronous muxes. An Add-Drop Mux (ADM) is a SONET mux that is capable of dropping off or accepting groups of DS1s while simultaneously providing transport to preceding and succeeding muxes.

[9] DS1s terminate on a DSX-1 and DS3s terminate on a DSX-3.

1. ADVANTAGES OF IDLC

Local loops connected to a digital circuit switch are provided more efficiently and cost effectively over IDLC than UDLC-provisioned loops because an IDLC requires neither an analog conversion at the CO, nor the AIU line card at the switch, nor manual MDF wiring. As a result, compared to today's IDLCs, UDLCs require a lot of unnecessary investment for digital-to-analog and analog-to-digital conversion equipment and MDF wiring in the central office. UDLCs also require substantial and unnecessary investment for switching equipment and the associated real estate and power requirements to convert the analog signal back to digital because today's digital switches require a digital signal.

In addition, the back-to-back digital-to-analog and analog-to-digital conversions inherent in the UDLC configuration reduce bit rate speeds for voice band data connections such as faxes or analog modems. Moreover, customers served by UDLC technology cannot receive ISDN and ADSL services without the installation of additional external loop electronics and digital transmission bandwidth at the UDLC, because UDLCs were neither designed nor have the capability to handle the bandwidth requirements of ADSL and ISDN.[10]

Consequently, the UDLC configuration is inefficient in today's digital network, would not be the technology of choice today for ILECs putting in additional DLCs served by digital switches, and does not represent a forward-looking technology.

2. TYPES OF IDLC CONFIGURATIONS

TR-008

The most prevalent IDLC configuration in place is the Bellcore TR-008 digital switch interface. This configuration evolved from the proprietary interface existing at divestiture, when the RBOCs had a large embedded base of Western Electric (now Lucent Technologies) SLC® 96 IDLCs that were only compatible with Western Electric switches.

With the break-up of the vertically integrated Bell System, the RBOCs could look to other equipment vendors. Given their large embedded base, these companies demanded that other switch vendors, such as Northern Telecom and Siemens

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[10] Therefore, where ILECs have proposed to provide CLECs seeking unbundled DLC loops only UDLC loops, but not IDLC loops, CLECs would be precluded from offering ISDN and ADSL services over those loops.

Stromberg-Carlson, make their switch interfaces SLC 96-compatible. Because of this customer demand, Bellcore defined the TR-008 specifications so switch vendors could make their products compatible with the Western Electric SLC 96 IDLC. The existence of non-proprietary specifications helped spawn new DLC vendors. Today many vendors' IDLCs can integrate with the TR-008 digital switch interface. The TR-008 interface was vastly superior to UDLC systems, as explained earlier, and gave the telephone companies a choice in DLC equipment.

The TR-008 interface comes in two flavors: mode 1 and mode 2. Mode 1 provides no concentration while mode 2 provides a 2:1 concentration. Mode 1 consists of four DS1s (96 DS0s) that serve up to 96 lines resulting in one DS0 dedicated per line. Mode 2 uses two DS1s to serve up to 96 lines.

As Bellcore released the more technologically advanced GR-303 specification, many equipment manufacturers developed equipment to meet this newer specification.[11] Anticipating the release of the GR-303 specification, many built their TR-008 IDLCs such that they could be upgraded to GR-303. Consequently, many of the IDLCs deployed by ILECs today are capable of complying with both Bellcore's TR-008 and GR-303 standards. However, there are some older TR-008 IDLCs that cannot be upgraded to GR-303.

GR-303

In response to telephone companies' demand for an IDLC that could interface more efficiently than the TR-008 with the digital switch, and could extend the ISDN signal to customers served by facilities exceeding the maximum copper loop length requirements for ISDN, Bellcore developed GR-303. These specifications are defined in Bellcore's Generic Requirements "GR-303, Integrated Digital Loop Carrier System Generic Requirements, Objectives and Interface." GR-303 enabled the IDLC to dynamically allocate transport bandwidth by assigning a channel to a line on a call-by-call basis rather than dedicating channels to lines. It improved transport efficiency by extending the switch concentration ratio out to the IDLC. For example, at a 4:1 concentration ratio, a GR-303 IDLC can serve approximately twice as many lines as a TR-008 mode 1 (4 DS1s) IDLC, with half as many DS1s. That is, a GR-303 IDLC can serve 188[12] lines with 2 DS1s. The concentration ratio is also scaleable,

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[11] Vendors and products include DSC Litespan 2000, Lucent SLC 2000, NORTEL Access Node, and RELTEC DISC*S. The latest IDLCs which can provide voice and advanced services such as DSL include Lucent's AnyMedia, Fujitsu's FACTR, AFC UMC-1000, and DSC's Litespan ADSL

[12] Twice as many lines would be 192 but four DS0s are reserved; one each for primary and backup EOC channels and one each for primary and backup TMC channels.

depending on the customer's traffic usage requirements.[13] As shown in Figure 4 and described in detail in Section IV, the GR-303 interface group can handle far more traffic than the TR-008 interface group. Also, GR-303 IDLCs efficiently support ISDN, resulting in more efficient transport and switching utilization.

The GR-303 interface has capacity for a minimum of two DS1s[14] and a maximum of twenty-eight DS1s. As shown in Figure 4, the first DS1 in the GR-303 Interface Group contains an Embedded Operations Channel (EOC) and a Time Slot Management Channel (TMC), and 22 channels available for customers. The EOC provides a communication path for operations and maintenance. The TMC assigns time slots for voice grade circuits and the ISDN B-channels. These functions – and thus the two channels – are needed for GR-303 to provide variable concentration and bandwidth assignment.

The second DS1 has backups for the EOC and TMC channels to provide redundancy, and 22 subscriber channels. The remaining DS1s do not need their own EOC or TMC, and thus each has the full complement of 24 channels.

As shown in Figure 5, the GR-303 IDLC RT can simultaneously accommodate TR-008 interface groups, GR-303 interface groups, and Integrated Network Access (INA) [15] interface groups. As discussed in greater detail in Section IV, this capability allows a GR-303 IDLC to integrate with several switches simultaneously.

The GR-303 IDLC technology provides a highly efficient and very powerful DLC network for local loops. Most GR-303 IDLCs have been constructed to support UDLC operation and/or TR-008 integration because manufacturers have had to be sensitive to carriers' embedded base of analog switches. While these GR-303 IDLCs can be configured to operate in UDLC mode, they are not UDLCs.

Many ILECs are deploying GR-303 capable IDLCs in their networks today,[16] and the trend is expected to increase because GR-303 is much more efficient, and

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[13] The concentration ratio is determined by the number of DS1s provisioned, which is engineered based on IDLC customers' traffic requirements and is usually engineered to the same requirements as a direct line-side analog interface at the digital switch.

[14] One DS1 may be used if redundancy is not required.

[15] INA will be discussed in the next section of this paper.

[16] See, for example, DLC Trends presentation by Bellcore at GR-303 Integrated Access Symposium, San Diego, CA, July 29-30, 1998 - www.bellcore.com/gr/GR303.html#forum. Nationally, the average annual increase in DLC served lines is approximately 20 percent, compared to an annual growth in access lines of 3 to 5 percent.

IDLC costs are decreasing while other outside plant costs increase.[17] Table 1, from the Bellcore DLC Trends presentation at the GR-303 Integrated Access Symposium, shows the percentage of working lines served by all DLC technologies and by GR-303-capable DLC, for the RBOCs and GTE. This suggests an overall DLC penetration rate of about 20 percent and a GR-303-capable DLC penetration rate of 10 percent.[18]

Table 1
Percent of Working Lines Served by DLCs

	GR-303 Capable DLC	All DLC Technologies
Ameritech	6%	13%
Bell Atlantic	18%	32%
BellSouth	17%	36%
GTE	6%	16%
NYNEX	7%	13%
Pacific Telesis	3%	6%
Southwestern Bell	7%	14%
US West	10%	17%
National Total	10%	20%

3. SUMMING UP GR-303 ADVANTAGES

Bandwidth Efficiency

The GR-303 IDLC provides for significant efficiencies by moving the concentration function from the switch to the RT. GR-303 makes very efficient

[17] Since the use of GR-303 technology requires both software and hardware upgrades to many embedded switches, at least one ILEC (PacBell) has stated that in many situations GR-303 does not "cost out" and therefore it does not intend to deploy it widely. This raises an important public policy issue. Is the PacBell decision based strictly on the merits of the technology or is it skewed by the strategic consideration that deployment of GR-303 will remove a barrier to competitive entry? That is, is a decision not to deploy the technology beneficial to PacBell shareholders but inconsistent with the public interest in fostering competition?

[18] Data presented by Westell at a recent DSL conference corroborates these numbers. Of the approximately 35 million lines served by DLC (out of approximately 172 million access lines nationwide), 7.5 million are SLC96, 15 million SLC5, 2.5 million SLC2000, 7 million DSC Litespan, and 3 million others (Nortel, Fujitsu, AFC, Reltec, etc.). Source: Westell, Commercializing DSL Technologies presentation, September 25, 1998, Atlanta GA.

use of the transport bandwidth medium and switch terminations by assigning a channel to the customer on a call-by-call basis as opposed to "nailing up" or dedicating the channel, as in TR-008. Hence GR-303 requires less bandwidth and switch terminating capacity than a TR-008 IDLC or a UDLC.

ISDN Provisioning

Prior to the availability of GR-303, ISDN provisioning on DLCs was expensive because it required using Basic Rate ISDN Terminal Extender (BRITE) plug-in cards. ISDN provisioning was inefficient because three DS0s with a total capacity of 192 Kbps were needed to carry the ISDN 2B+D channels with a total required capacity of 144 Kbps. Because GR-303 IDLCs are designed to deliver ISDN, ISDN can be provisioned easier and more efficiently than before because a single DS0 can be used to carry four D channels.

Optimizing OSS

GR-303 has been developed to operate in conjunction with forward-looking operations support systems such as OPS/INE, which provide for highly automated, centralized, and remotely located operations centers. GR-303 also supports digital connectivity for non-locally-switched services, such as foreign exchange lines, and non-switched services, such as Digital Data Service or DS0 private lines.

IV. UNBUNDLING ALTERNATIVES

Some parties have claimed that since an IDLC signal is digital and is connected to the switch IDT there is no way to unbundle the IDLC. They further contend that because it is allegedly technically unfeasible to unbundle IDLC loops, an ILEC customer currently being served by an IDLC loop who chooses to get service from a CLEC using unbundled ILEC loops could not stay on the IDLC loop. Rather, the customer's service would have to be put onto an analog loop (spare or retired copper loop or a UDLC).

In fact, there are no technical impediments to a customer receiving service from a CLEC via an unbundled ILEC IDLC loop as long as the ILEC controls and administers the RT and the network. If the ILEC manages the network (e.g., assigns CLECs to software groups in the RT, handles alarms, handles testing, etc.) it can simply hand off traffic to the CLEC through interconnection, which is done all the time today. If, however, CLECs want to jointly manage the RT, provision services themselves, handle their own alarms, etc. some technical problems may occur such as security and access to a single alarm group in the RT. These problems are being addressed by vendors and Bellcore's GR-303 Forum.

Unbundling of IDLCs is technically feasible, provides non-discriminatory access to end-to-end digital services, and is less disruptive to the customer than moving the service off of the IDLC. Placing an IDLC served customer onto a UDLC harms the customer because it is a lesser grade of service due to the extra analog–to-digital conversions required. The customer's analog signals would not be at parity with the IDLC-provided service. In addition, the customer probably would experience provisioning delays because UDLC or copper-fed service requires manual MDF cross-connects as opposed to electronic provisioning with IDLCs.

There currently are four technically feasible unbundling methods that can provide CLECs with non-discriminatory access to the customers served by IDLCs:

1. Multiple Switch Hosting
2. Integrated Network Architecture (INA)
3. Digital Cross-Connect System (DCS) Grooming
4. Side-Door Grooming

1. MULTIPLE SWITCH HOSTING

Multiple Switch Hosting is the ability of one IDLC RT to interface with multiple switches simultaneously. It allows the IDLC technology residing in the RT to serve the ILEC plus multiple CLEC switches.[19] Multiple Switch Hosting is possible because all GR-303 IDLCs have a Time Slot Interchanger (TSI) that allows a CLEC customer(s) to be assigned to CLEC-specific channelized DS1s served by the RT. That is, the ILEC and each CLEC can be assigned one or more DS1s (with each DS1 having up to 24 distinct DS0 voice grade channels), with their customer traffic routed to their assigned DS1s. This is accomplished by "field grooming"[20] at the RT – the process of using the TSI in the RT to map specific DS0s to specific DS1s or groups of DS1s, called "interface groups," as shown in Figure 5. If the customer changes his or her service back to the ILEC

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[19] See DSC Communications web site http://www.dsccc.com/lsp2000.htm. "The Litespan can simultaneously support different switch interfaces from the same common control, making the system ideal for the transition to future network service and service to *multi-entity* [emphasis added] offices."

[20] The grooming is done in software and no field visits are ever required. Field grooming simply means that the grooming occurs electronically in the field as opposed to the central office.

or to another CLEC, field grooming allows the appropriate cross-connects to be made electronically in the same manner as described above.[21]

As mentioned earlier and shown in Figure 5, the GR-303 IDLC RT can simultaneously support interface groups for the TR-008 interface format, the GR-303 interface format, and the INA interface format. This Multiple Switch Hosting capability allows a single IDLC to interface with several ILEC and/or CLEC switches simultaneously,[22] with more than one type of switch interface (GR-303, TR-008, and/or INA) protocol. The Multiple Switch Hosting capability exists in most of today's IDLCs, and Bellcore's GR-303 specifications require the capability to be integrated with a minimum of two switches. Some vendors already provide Multiple Switch Hosting with up to five different switches and may soon be able to do so with up to eight.

Multiple Switch Hosting requires the use of one of the forward-looking operational support systems currently available, such as OPS/INE, and software provided by the IDLC vendor, in conjunction with the Time Slot Interchanger, to migrate a customer among local service providers.

First, the RT's Time Slot Interchanger electronically assigns the signal where it is placed on a DS1 in the appropriate GR-303, TR-008, or INA interface group. The traffic is fed into the RT's fiber mux and then transported over fiber (on a CLEC or ILEC channelized DS1) to the CO, where the fiber is terminated onto the LGX and cross-connected to the CO fiber mux (see Figure 6). The fiber mux decodes the optical signal into electrical DS1s that are then connected to the DSX patch panel, where the respective DS1s are handed off to the ILEC or CLEC equipment. The reverse is true for traffic flowing in the other direction. A CLEC can use leased or owned transport from the ILECs DSX panel to the CLEC CO, and interface the DS1 signal into its own IDT. This is the simplest and quickest option for CLECs to get the digital loop. Alternatively, a CLEC can take the DS1 signal from the DSX to its collocation cage. Collocation, while sometimes

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[21] Field grooming at the RT requires that each customer be assigned a Line Circuit Address (LCA) and Call Reference Value (CRV). The customer's copper pair is terminated at the RT and is assigned a CRV in the appropriate GR-303 Interface Group, via the OSS interface. With multiple GR-303 Interface Groups, a CRV of any Interface Group can be assigned to the LCA corresponding to a customer's number. The GR-303 Interface Group uses the CRV in the Timeslot Management Channel to dynamically assign DS0s or fractional DS0s to a circuit on a call by call basis as directed by the TSI. This means, unlike TR-008, no DS0s are permanently assigned to any line. The CRV is assigned to an interface group (in software) to a LCA via a table in both the switch IDT TSI and the IDLC TSI. Figure 5 depicts a multi hosting capable IDLC.

[22] The number of integrated switches to a RT is a software capability inherent in the GR-303 specification.

desirable for things such as testing, is technically unnecessary for DS-1 level signals.

The Multiple Switch Hosting capability is the recommended forward-looking network architecture for unbundling in a competitive environment because, regardless of the local service provider, carriers have equal and non-discriminatory access to the capabilities of this highly efficient, high-quality digital local loop facility.

2. INTEGRATED NETWORK ACCESS (INA)

INA is an architecture inherent in IDLCs that allows specific DS0s to be mapped (groomed) into a unique interface group. This offers another method of unbundling GR-303 IDLC, albeit less efficiently than the GR-303 or TR-008 interface groups described by the Multiple Switch Hosting section above.

Originally, INA was designed to enable non-locally switched (FX service) and non-switched service (private line) DS0s to be terminated and redirected to the interoffice transmission network.[23] INA is another method of unbundling a GR-303 IDLC because the TSI can map (field groom) specific DS0s into specific Integrated Network Access groups as D4 formatted[24] DS1s. (See Figure 7.) This D4 format signal then goes to a CLEC "city ring" or collocation area where the INA DS1s are first terminated onto another IDLC (often called the unbundling RT) that converts the INA DS1 to GR-303 DS1s, which then go to the CLEC's switch IDT.

In this scenario, the CLEC would have the technologically feasible option of collocating or not collocating the unbundling RT. In most situations, it is more efficient for the CLEC to access the INA DS1s without any sort of collocation arrangement.

The INA option may force a CLEC to invest in an unbundling RT in its collocation area or CO, and therefore is less efficient than the Multiple Switch Hosting (GR-303, TR-008) solution. Multiple Switch Hosting is not widely available today, however, and in its absence some CLECs currently are using the (INA) unbundling technique to provide service to IDLC-served customers.

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[23] Bellcore, GR-303, IDLC Generic Requirements, Objectives and Interface, page 1-3, paragraph 1.3.1.

[24] D4 is a T1 framing format that does not have bit error rate detection.

In the past, INA use was limited to special services provisioning. Some CLECs, facing the current paucity of GR-303 interface groups supported by some DLC products, have resorted to a second-best solution and used INA for regular POTS switched services. This essentially allows any number of CLECs to interconnect to the IDLC. The number of available INAs is only limited by the DS1 capacity of the transport system (e.g., 84 DS1s for a SONET OC-3 system) minus any DS1s used for GR-303 or TR-008.

3. Digital Cross-Connect System (DCS) Grooming

A DCS is an intelligent software-based network device used in the central office to electronically cross-connect DS0s between multiple DS1s using its inherent Time Slot Interchanger.[25] This is called DS0/DS1 grooming. When unbundling the large embedded base of TR-008 systems, a DCS can be used to unbundle IDLC remotes by grooming the DS1s and redirecting DS0s within specific DS1s to the ILEC or CLEC(s) (see Figure 8). Figure 9 shows one ILEC's view of DCS grooming.[26] While a DCS can support TR-008 integrated interfaces, it is incompatible with GR-303 because it does not support the Embedded Operations Channel and Time Slot Management Channel that dynamically assign time slots on a call-by-call basis and communicate with the IDLC and IDT. It thus cannot take advantage of GR-303 efficiencies.

Using a DCS may be the most efficient method of unbundling those DLCs (such as the SLC 96) that cannot support GR-303, INA, or Multiple Switch Hosting. Also, DCS grooming can be used where the TR-008 IDLC has a limited quantity of TR-008 interface groups. In addition, DCS grooming makes it unnecessary to undertake any changes at the IDLC RT, as all of the DS0 redirecting is done electronically by the DCS in the CO. It can also be used for small quantities of loops as an interim measure, until either Multiple Switch Hosting or INA is available. New facility-based service providers can use a DCS to interconnect with the embedded base of TR-008 IDLCs operating in Mode 1, eliminating the need to first convert the signal to analog or incur replacement or upgrade costs on older IDLCs.

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[25] Lucent Technologies – DACS II Release 7.0 PDS Operations and Maintenance Manual Volume 1 – Acceptance and Operations – 365-353-051 Issue 1, Section 1.2.1 --- DACSII Overview.

[26] DCS grooming as depicted in Appendix C of Bell Atlantic's report to the New York State PSC in Cases 95-C-0657, 94-C-0095, and 91-C-1174. See *Report of Bell Atlantic – New York on the feasibility of alternative means for implementing central office cross-connections,* dated November 23, 1998.

4. SIDE-DOOR GROOMING

Side-door grooming (also known as hair-pinning) is a switch-based technology that requires that the Time Slot Interchanger in the IDT of the digital switch collect and route DS0s from a DS1 port connected to the GR-303 IDLC remote to another DS1 port on the IDT for interoffice connection. See Figure 10. Side-door grooming is done in the D4 format and is only utilized for special circuits where the quantities are insufficient to warrant the cost of deploying a DCS. A major disadvantage of the side-door technique (in addition to the D-4 format) is it unnecessarily and quickly consumes ILEC IDT switch resources, since an IDT time slot is nailed up to the IDLC DS0s. Multiple Switch Hosting and INA are more efficient unbundling techniques.

Until Multiple Switch Hosting or INA is more widely available, side-door grooming may be used to unbundle a few lines since the Time Slot Interchanger at the IDT provides the same functionality as the Time Slot Interchanger at the RT. However, this is the least desirable unbundling technique.

V. CONCLUSION

GR-303 IDLC is the forward-looking DLC technology deployed in the network today because of its transmission quality, range of service capabilities, and cost efficiencies. Many CLECs have deployed Bellcore GR-303-compliant IDLC technology in their networks because it expands network capability and is cost-effective, thus benefiting consumers in two ways. But consumers will not benefit from the new technology if their decision to be served by a CLEC using unbundled ILEC loops results in their being forced off IDLC loops.

Today it is technically feasible to unbundle IDLCs. The most efficient way to provide unbundled GR-303 IDLCs is through Multiple Switch Hosting. Absent sufficient GR-303 interface groups at the IDLC RTs, Multiple Switch Hosting can also be accomplished via TR-008 and INA interface groups. Multiple Switch Hosting, as well as the other techniques described in this paper, enables IDLC unbundling and digital signal handoff to CLECs.

The UDLC and all copper facility forms of DLC unbundling are inferior. Placing a CLEC customer on a UDLC from a GR-303-capable or TR-008 IDLC is unnecessary and unacceptable because of the signal degradation and longer provisioning time for this archaic analog manual technology. TR-008 handoff, while better than a UDLC solution, is inferior to GR-303 because it does not offer variable concentration and does not utilize transport efficiently. However, where GR-303 is not available, TR-008 and INA are adequate interim unbundling solutions.

Upgrading of GR-303 IDLC systems represents a normal and necessary network modernization path because the technology is more efficient and offers better service to customers served by IDLCs. But ILECs will have an incentive to delay these network upgrades to curtail CLEC access to unbundled IDLCs. The public policy problem that regulators must grapple with is how to foster deployment of these new, efficient technologies when incumbent LECs recognize that such deployment also fosters competition.

To ensure that the advantages of these new technologies are available to CLECs and their customers, regulatory authorities should:

1. Rule that it is technologically feasible to digitally unbundle IDLCs and require CLEC access to unbundled IDLCs without manual cross connects.

2. Identify GR-303 and Multiple Switch Hosting as the forward-looking IDLC technology to be used in determining recurring and non-recurring rates for unbundled loops.

3. Ensure that CLECs receive GR-303 digital signal from GR-303 capable IDLCs whenever technologically feasible.

4. Require IDLCs to be unbundled using Multiple Switch Hosting whenever and wherever technically feasible.

5. Order TR-008 or INA unbundling until GR-303 is deployed.

6. Ensure future GR-303 requirements provide open equivalent interfaces to all carriers on an equal and non-discriminatory basis.

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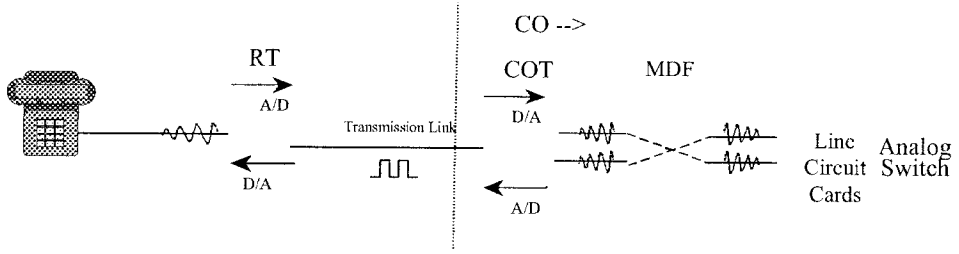


Figure 1 (a) - UDLC with an analog switch

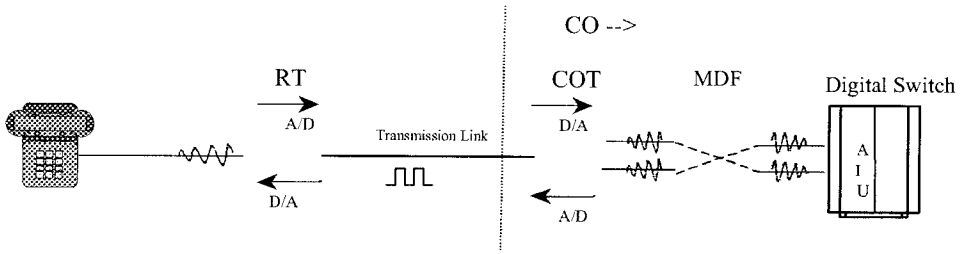


Figure 1 (b) - UDLC with a digital switch

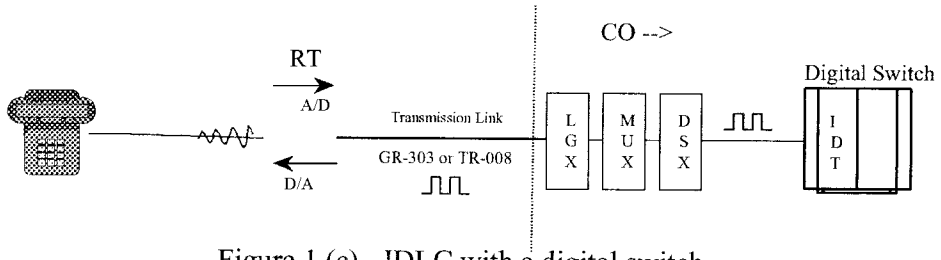


Figure 1 (c) - IDLC with a digital switch

Figure 1 UDLC / IDLC with a local switch

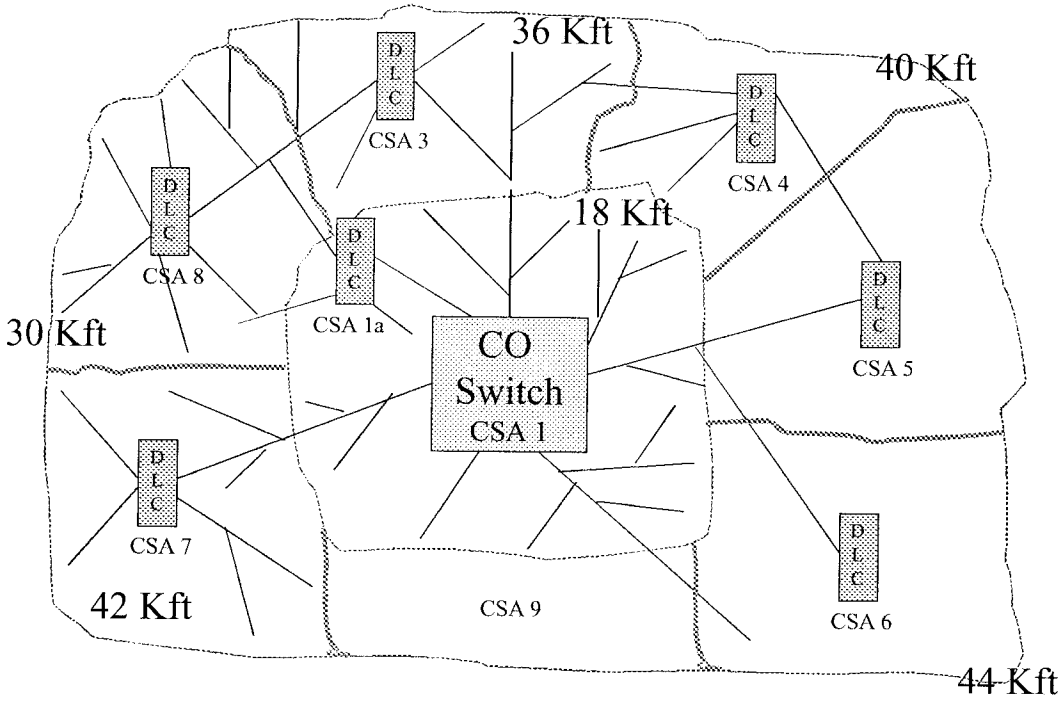


Figure 2 CSA design

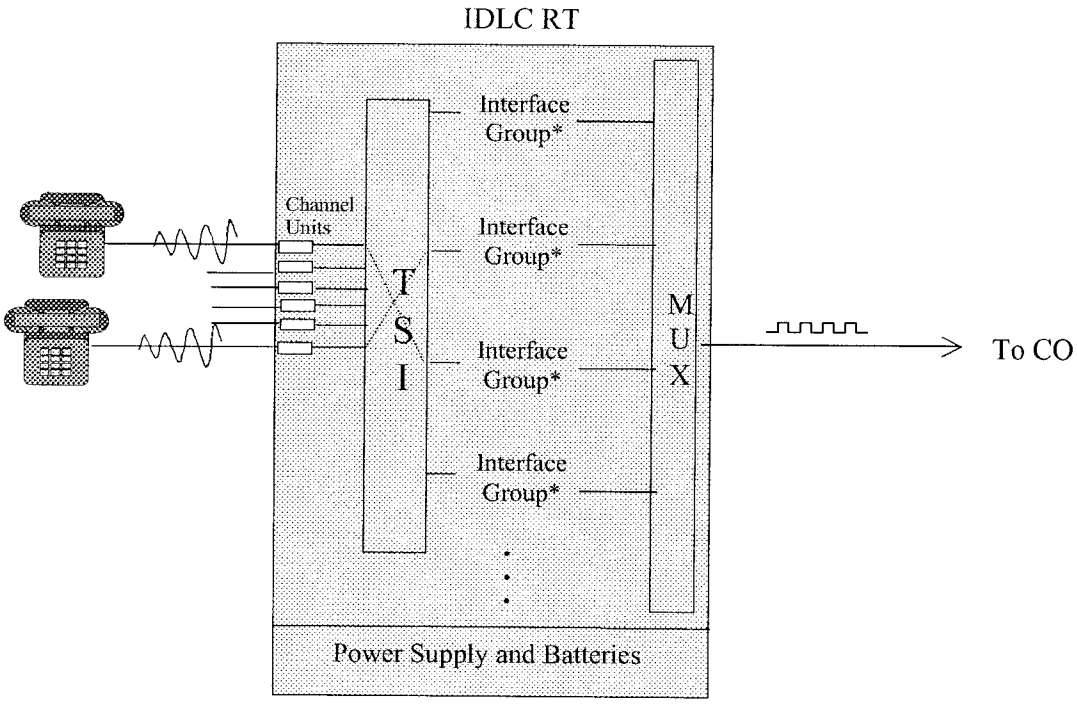


Figure 3 Generic IDLC RT

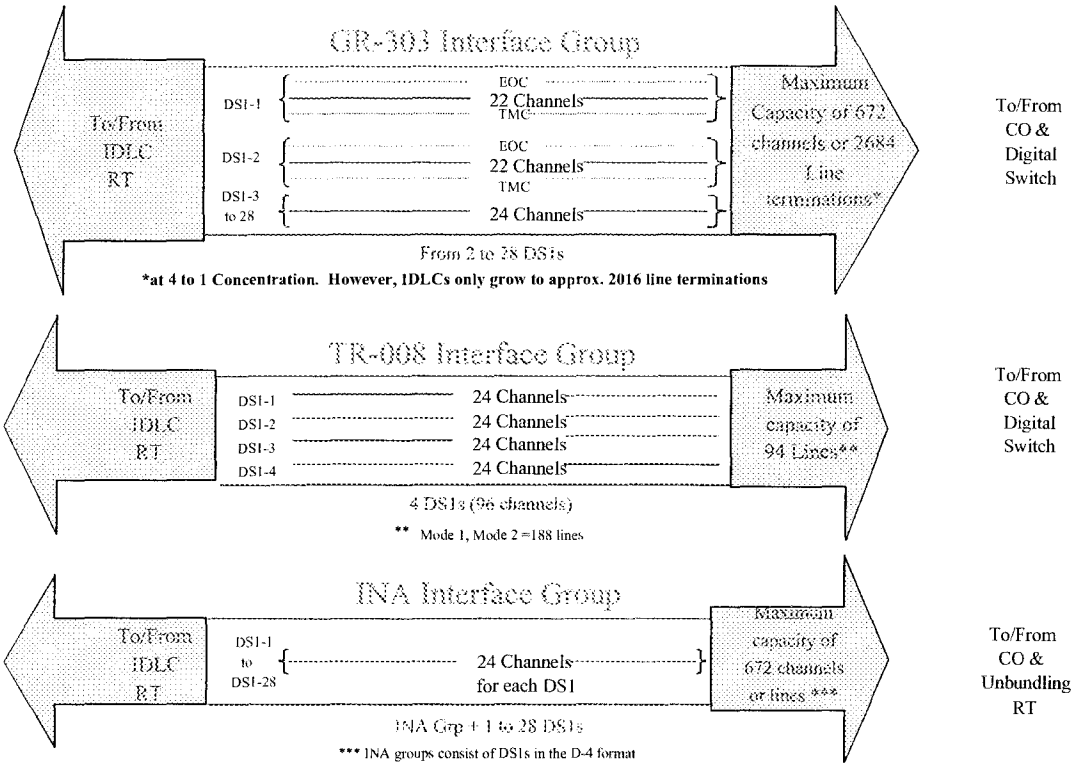


Figure 4 Interface Groups

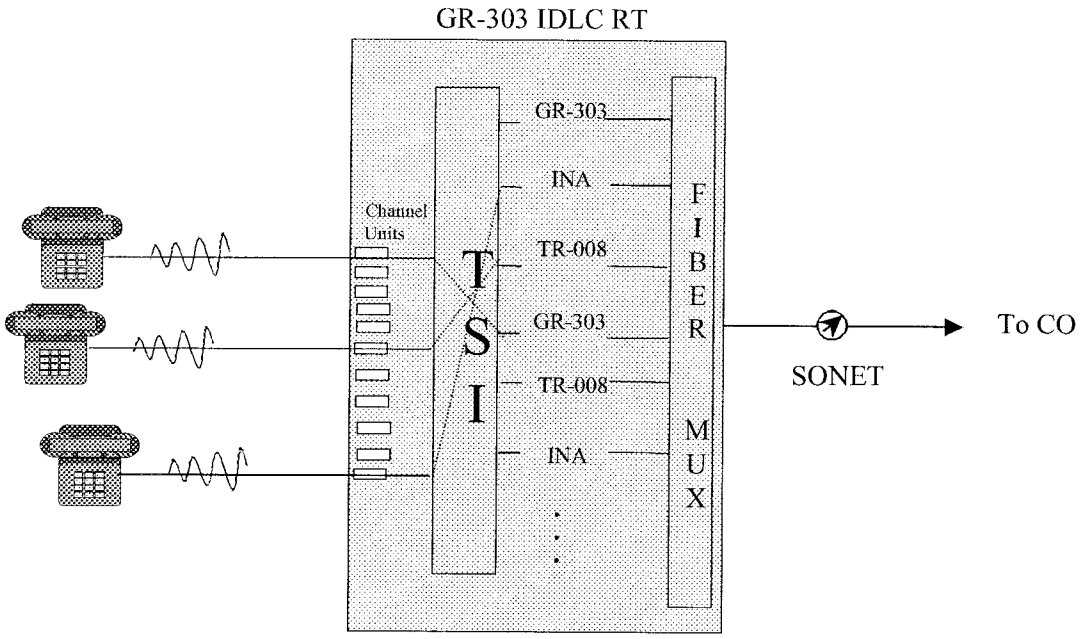


Figure 5 GR-303 IDLC RT

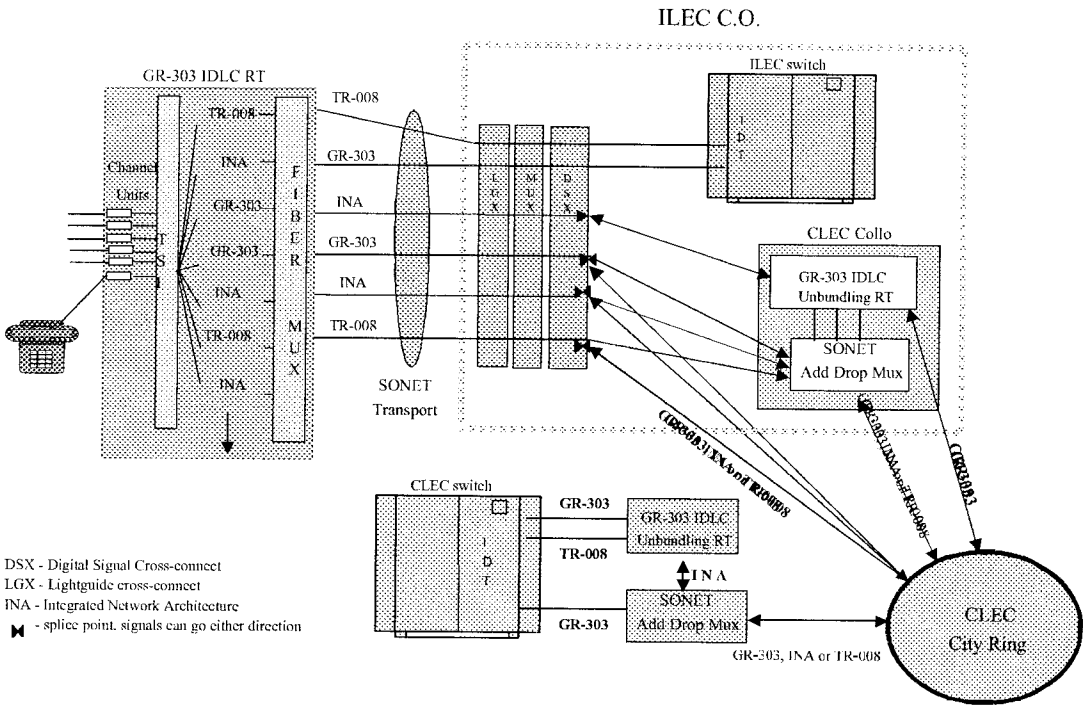
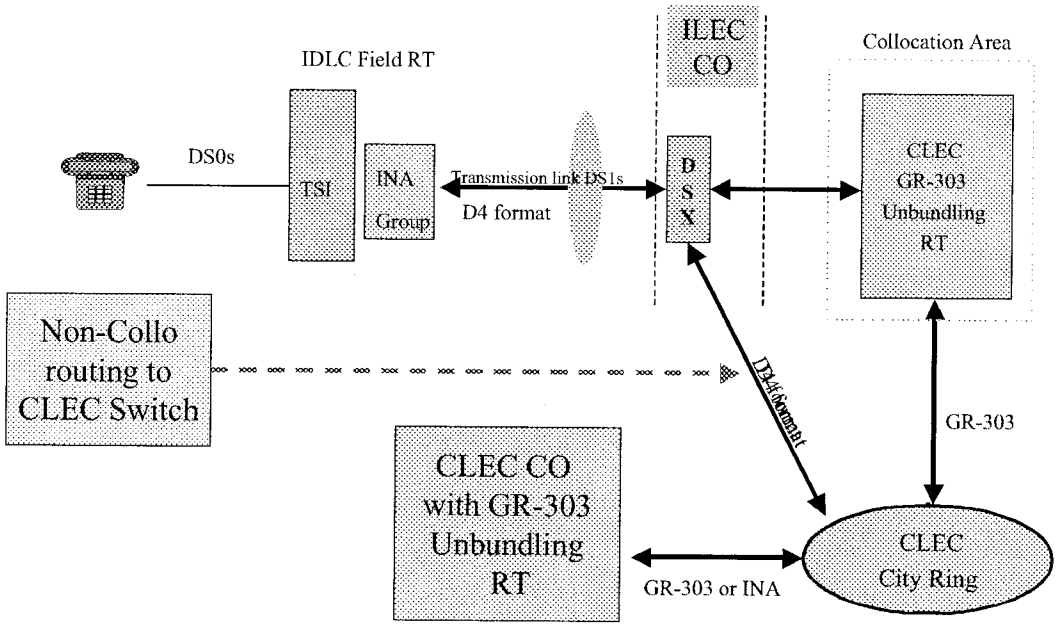


Figure 6 Multiple Switch Hosting



(D-4 conversion via an unbundling RT)

Figure 7 INA grooming

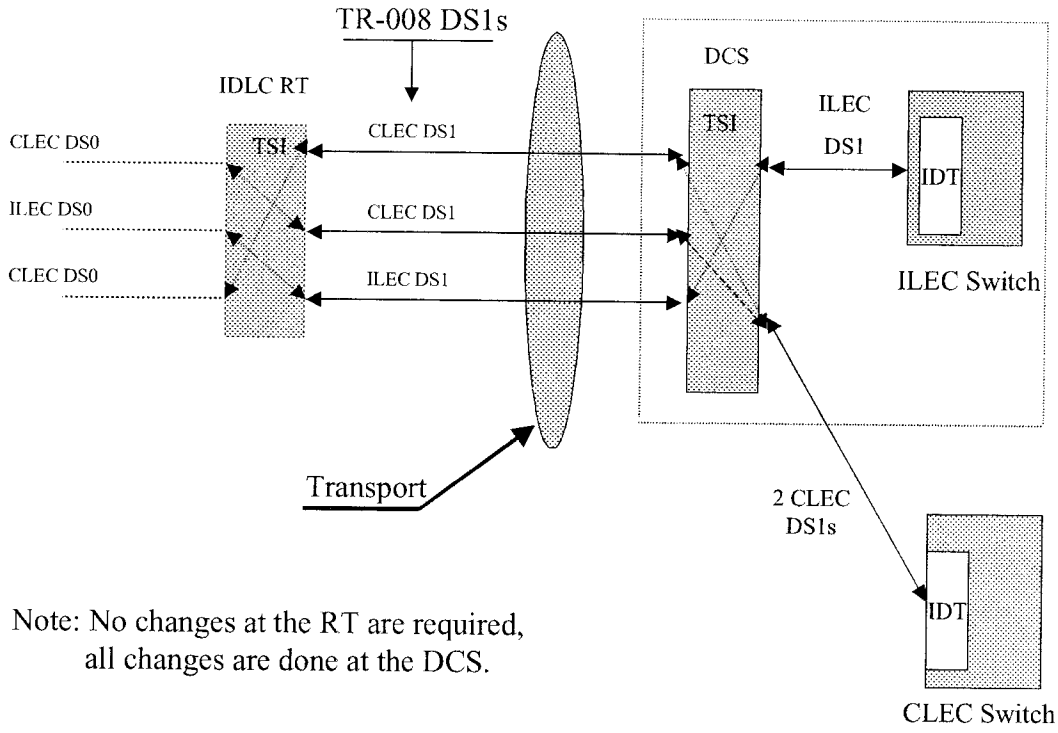


Figure 8 Digital Cross-Connect System (DCS) grooming

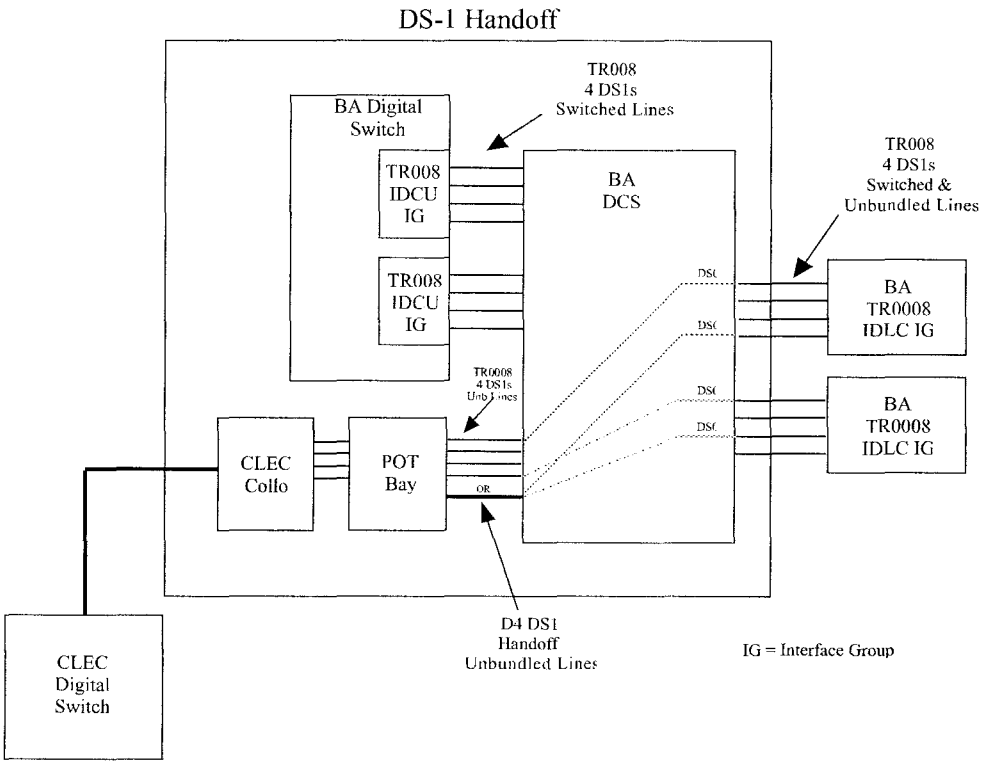


Figure 9 DCS grooming handoff to CLECs by Bell Atlantic-NY

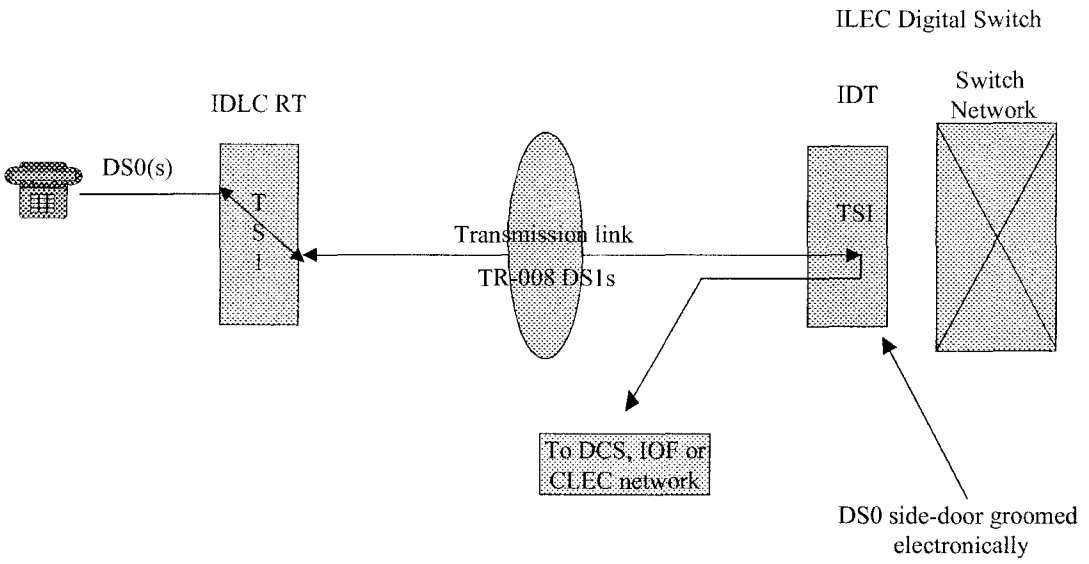


Figure 10 Side-door grooming

WALSH EXHIBIT 3

Line #	UNE/Service Description	Service Order	Installation	Total Without Premises Visit	Premises Visit	Total With Premises Visit	Manual Surcharge	Service Order	Installation	Total Without Premises Visit	Premises Visit	Total With Premises Visit	Manual Surcharge
A	B	C	D	E C+D	F	G E+F	H	I	J	K I+J	L	M K+L	N
VZ	Recommended by the NJ-BPU												
1	Two Wire New Initial	$2.31	$23.15	$25.46	$73.36	$98.82	$15.02	$3.29	$60.22	$63.51	$95.59	$159.10	$29.18
2	Two Wire New Additional	$0.00	$20.82	$20.82	$30.89	$51.71	N/A	$0.00	$37.48	$37.48	$40.26	$77.74	N/A
3	Two Wire HotCut Initial	$2.31	$157.45	$159.76	$73.36	$233.12	$15.02	$3.29	224.1	$227.39	95.59	$322.98	29.18
4	Two Wire HotCut Additional	$0.00	$73.01	$73.01	$30.89	$103.90	N/A	$0.00	103.23	$103.23	40.26	$143.49	N/A
84	IDLC Two Wire New Initial	$7.71	$23.15	$30.86	$73.36	$104.22	$20.42	$11.02	$33.20	$44.22	$95.59	$139.80	$29.18
85	IDLC Two Wire New Additional	$0.00	$14.65	$14.65	$30.89	$45.54	N/A	$0.00	$20.91	$20.91	$40.26	$61.17	N/A
VZ	Adjusted BPU order												
1	Two Wire New Initial	$2.31	$23.15	$25.46	$73.36	$98.82	$15.02	$3.29	$60.22	$63.51	$95.59	$159.10	$29.18
2	Two Wire New Additional	$0.00	$20.82	$20.82	$30.89	$51.71	N/A	$0.00	$37.48	$37.48	$40.26	$77.74	N/A
3	Two Wire HotCut Initial	$2.31	$23.15	$25.46	$0.00	$25.46	$15.02	$3.29	$44.01	$47.30	$0.00	$47.30	29.18
4	Two Wire HotCut Additional	$0.00	$17.12	$17.12	$0.00	$17.12	N/A	$0.00	$27.54	$27.54	$0.00	$27.54	N/A
84	IDLC Two Wire New Initial	$2.31	$23.15	$25.46	$73.36	$98.82	$20.42	$3.29	$33.20	$36.49	$95.59	$132.08	$29.18
85	IDLC Two Wire New Additional	$0.00	$14.65	$14.65	$30.89	$45.54	N/A	$0.00	$20.91	$20.91	$40.26	$61.17	N/A
ATT	Recommended by AT&T												
6	POTS / ISDN BRI Migration (UNE Loop) -100% Copper	$0.00	$ 5.43	$5.43	$0.00	$5.43	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	POTS / ISDN BRI Disconnect (UNE Loop) - 100% Copper	$0.00	$ 4.63	$4.63	$0.00	$4.63	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	POTS / ISDN BRI Migration (UNE Loop) -100% IDLC	$0.00	$ 0.27	$0.27	$0.00	$0.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	POTS / ISDN BRI Disconnect (UNE Loop) -100% IDLC	$0.00	$ 0.27	$0.27	$0.00	$0.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ATT	Recommendations by AT&T -Melded Rate (Installation + Disconnect)												
	POTS / ISDN BRI Migration (UNE Loop)	$0.00	$4.35	$4.35	$0.00	$4.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Adjustments to Verizon's NRCM based on New Jersey Board of Public Utilities letter 11/20/01

1. Adjusted "IDLC Two Wire New Initial" (element #84) Service Ordering cost to be consistent with adjustments made to "Two Wire New Initial."
2. Adjusted "Two Wire HotCut Initial" (element #3) Installation cost based on recommended network mix; copper / IDLC. (40% from "Two Wire New Initial" and 60% from "IDLC Two Wire New Initial")
   a. Eliminated "all field installation charges associated with Migration orders" (per order)
3. Adjusted "Two Wire HotCut Additional" (element #4) Installation cost based on recommended network mix; copper / IDLC. (40% from "Two Wire New Additional" and 60% from "IDLC Two Wire New Additional")
   a. Eliminated "all field installation charges associated with Migration orders" (per order)

NRC #	New Jersey - NRC Elements	Total Cost		Total Cost		6
6	POTS / ISDN BRI Migration (UNE Loop) -MELDED RATE	$ 2.33	<-- with overhead	$ 2.12	<-- without overhead	

SERVICE ORDER PROCESS / NON-RECURRING TYPE MATRIX

1	2	3	4	5	6	7	8	9
ID No.	Process Flow / Activity	Step	System or Action	Work Center	A Probability (%)	B Time (minutes)	C Rate ($/hour)	D = (A x B x C) / 60 Cost w/out Overhead ($)
1	***Pre Order Steps***							
2	CLEC customer contact	Pre-Order	CLEC Customer Service Representative		NA	-		
3	CLEC requests customer address data, CSR, and appointment from ILEC	Pre-Order	CLEC gateway		NA	-		
4	ILEC gateway requests address data from Administrative Information System and CSR	Pre-Order	Premis, ALOC, BOSS, CRIS		100.0%	-	R	$ -
6	***Ordering Steps***							
7	CLEC customer service representative inputs LSR information into LOS	Order	ACTIVIEW		NA			
8	ILEC gateway receives, validates and logs LSR, returns FOC, and passes LSR to SOG	Order	ILEC gateway, STAREP, DOE		100.0%	-	R	$ -
10	ILEC SOG retrieves CSR data, formats and passes to SOP	Order	BOSS, SOP		100.0%	-	R	$ -
11	***Provisioning Processing Steps***							
13	SOP sends request to SOAC	Provisioning	SOP		100.0%	-	R	$ -
14	SOAC analyzes order, generates assignment requests for OSP, COE, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
16	LFACS makes OSP assignments, e.g., cable and pair	Provisioning	LFACS		100.0%	-	R	$ -
18	SWITCH provides equipment and facility assignments	Provisioning	SWITCH		100.0%	-	R	$ -
20	SOAC receives COE, OSP, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
27	SOAC delivers recent change translation information	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
29	MARCH updates LDS	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
30	SOAC delivers equipment and facility information to NSDB	Provisioning	NSDB		60.0%	-	R	$ -
32	NSDB downloads assignments to OPS/INE	Provisioning	OPS / INE		60.0%	-	R	$ -
34	OPS/INE delivers cross connect and equipment provisioning message to INE	Provisioning	OPS / INE		60.0%	-	R	$ -
40	WFA/C updates NSDB	Provisioning	OPS / INE		60.0%	-	R	$ -
47	***Pull and Analyze Order Steps***							
48	Pull and analyze order: FCC; (copper%)	Provisioning	ILEC manual activity	FCC	40.0%	2.50	$ 43.29	$ 0.72
55	***Travel Time Steps***							
56	Travel time to the central office: CO non staffed, # orders per trip, Copper	Provisioning	ILEC manual activity	FCC	2.0%	20.00	$ 43.29	$ 0.29
71	***Element Type Detail Steps***							
73	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	40.0%	0.25	$ 43.29	$ 0.07
74	Install cross connect from MDF to CFA appearance	Provisioning	ILEC manual activity	FCC	40.0%	1.00	$ 43.29	$ 0.29
76	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	40.0%	0.25	$ 43.29	$ 0.07
82	Install DSO TSI at RT (CPU time)	Provisioning	CPU Time		60.0%		R	$ -
198	***Fall Out Steps***							
202	Fall Out: RMAs forwarded to PAWS for reconciliation	Provisioning	CPU Time		2.0%		R	$ -
203	Fall Out: Pull and analyze order: LAC	Provisioning	ILEC manual activity	LAC	2.0%	2.50	$ 41.75	$ 0.03
204	Fall Out: Resolve fallout: LAC	Provisioning	ILEC manual activity	LAC	2.0%	15.00	$ 41.75	$ 0.21
209	***Close Order Steps***							
210	Close order: FCC:Copper%	Provisioning	ILEC manual activity	FCC	40.0%	1.50	$ 43.29	$ 0.43
217	***Close Order Provisioning Steps***							
218	SOAC updates SOP	Provisioning	SOAC		100.0%	-	R	$ -
219	SOAC updates WFA, NSDB, LMOS, BOSS, CRIS, etc.	Provisioning	SOAC		100.0%	-	R	$ -
221	SOP completes LSR	Provisioning	SOP		100.0%	-	R	$ -
222	ILEC gateway notifies CLEC of completed order	Provisioning	ILEC gateway		NA			
223	ILEC billing system issues final bill to migrating customer	Provisioning	ILEC gateway		NA			
224	***End of Process Steps***							$ 2.12

NRC #	New Jersey - NRC Elements	Total Cost		Total Cost	
6	POTS / ISDN BRI Migration (UNE Loop) 100% Copper	$ 5.43	<-- with overhead	$ 4.93	<-- without overhead

6

SERVICE ORDER PROCESS / NON-RECURRING TYPE MATRIX

1	2	3	4	5	6	7	8	9
ID No.	Process Flow / Activity	Step	System or Action	Work Center	A Probability (%)	B Time (minutes)	C Rate ($/hour)	D = (A x B x C) / 60 Cost w/out Overhead ($)
1	***Pre Order Steps***							
2	CLEC customer contact	Pre-Order	CLEC Customer Service Representative		NA	-		
3	CLEC requests customer address data, CSR, and appointment from ILEC	Pre-Order	CLEC gateway		NA	-		
4	ILEC gateway requests address data from Administrative Information System and CSR	Pre-Order	Premis, ALOC, BOSS, CRIS		100.0%	-	R	$ -
6	***Ordering Steps***							
7	CLEC customer service representative inputs LSR information into LOS	Order	ACTIVIEW		NA			
8	ILEC gateway receives, validates and logs LSR, returns FOC, and passes LSR to SOG	Order	ILEC gateway, STAREP, DOE		100.0%	-	R	$ -
10	ILEC SOG retrieves CSR data, formats and passes to SOP	Order	BOSS, SOP		100.0%	-	R	$ -
11	***Provisioning Processing Steps***							
13	SOP sends request to SOAC	Provisioning	SOP		100.0%	-	R	$ -
14	SOAC analyzes order, generates assignment requests for OSP, COE, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
16	LFACS makes OSP assignments, e.g., cable and pair	Provisioning	LFACS		100.0%	-	R	$ -
18	SWITCH provides equipment and facility assignments	Provisioning	SWITCH		100.0%	-	R	$ -
20	SOAC receives COE, OSP, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
27	SOAC delivers recent change translation information	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
29	MARCH updates LDS	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
30	SOAC delivers equipment and facility information to NSDB	Provisioning	NSDB		0.0%	-	R	$ -
32	NSDB downloads assignments to OPS/INE	Provisioning	OPS / INE		0.0%	-	R	$ -
34	OPS/INE delivers cross connect and equipment provisioning message to INE	Provisioning	OPS / INE		0.0%	-	R	$ -
40	WFA/C updates NSDB	Provisioning	OPS / INE		0.0%	-	R	$ -
47	***Pull and Analyze Order Steps***							
48	Pull and analyze order: FCC; (copper%)	Provisioning	ILEC manual activity	FCC	100.0%	2.50	$ 43.29	$ 1.80
55	***Travel Time Steps***							
56	Travel time to the central office: CO non staffed, # orders per trip, Copper	Provisioning	ILEC manual activity	FCC	5.0%	20.00	$ 43.29	$ 0.72
71	***Element Type Detail Steps***							
73	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	100.0%	0.25	$ 43.29	$ 0.18
74	Install cross connect from MDF to CFA appearance	Provisioning	ILEC manual activity	FCC	100.0%	1.00	$ 43.29	$ 0.72
76	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	100.0%	0.25	$ 43.29	$ 0.18
82	Install DSO TSI at RT (CPU time)	Provisioning	CPU Time		0.0%		R	$ -
198	***Fall Out Steps***							
202	Fall Out: RMAs forwarded to PAWS for reconciliation	Provisioning	CPU Time		2.0%		R	$ -
203	Fall Out: Pull and analyze order: LAC	Provisioning	ILEC manual activity	LAC	2.0%	2.50	$ 41.75	$ 0.03
204	Fall Out: Resolve fallout: LAC	Provisioning	ILEC manual activity	LAC	2.0%	15.00	$ 41.75	$ 0.21
209	***Close Order Steps***							
210	Close order: FCC:Copper%	Provisioning	ILEC manual activity	FCC	100.0%	1.50	$ 43.29	$ 1.08
217	***Close Order Provisioning Steps***							
218	SOAC updates SOP	Provisioning	SOAC		100.0%	-	R	$ -
219	SOAC updates WFA, NSDB, LMOS, BOSS, CRIS, etc.	Provisioning	SOAC		100.0%	-	R	$ -
221	SOP completes LSR	Provisioning	SOP		100.0%	-	R	$ -
222	ILEC gateway notifies CLEC of completed order	Provisioning	ILEC gateway		NA			
223	ILEC billing system issues final bill to migrating customer	Provisioning	ILEC gateway		NA			
224	***End of Process Steps***							$ 4.93

NRC #	New Jersey - NRC Elements	Total Cost		Total Cost	
8	POTS / ISDN BRI Disconnect (UNE Loop)	$ 4.63	<-- with overhead	$ 4.21	<-- without overhead

8

SERVICE ORDER PROCESS / NON-RECURRING TYPE MATRIX

1	2	3	4	5	6	7	8	9
ID No.	Process Flow / Activity	Step	System or Action	Work Center	A Probability (%)	B Time (minutes)	C Rate ($/hour)	D = (A x B x C) / 60 Cost w/out Overhead ($)
1	***Pre Order Steps***							
2	CLEC customer contact	Pre-Order	CLEC Customer Service Representative		NA	-		
4	ILEC gateway requests address data from Administrative Information System and CSR	Pre-Order	Premis, ALOC, BOSS, CRIS		100.0%	-	R	$ -
5	ILEC gateway formats and returns address, CSR, and appointment data to CLEC	Pre-Order	WFA/FORCE, ACTIVIEW		100.0%	-	R	$ -
6	***Ordering Steps***							
7	CLEC customer service representative inputs LSR information into LOS	Order	ACTIVIEW		NA			
8	ILEC gateway receives, validates and logs LSR, returns FOC, and parses LSR to SOG	Order	ILEC gateway, STAREP, DOE		100.0%	-	R	$ -
11	***Provisioning Processing Steps***							
13	SOP sends request to SOAC	Provisioning	SOP		100.0%	-	R	$ -
14	SOAC analyzes order, generates assignment requests for OSP, COE, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
17	LFACS makes OSP spare and available for reassignments, e.g., cable and pair	Provisioning	LFACS		100.0%	-	R	$ -
19	SWITCH inventories as spare and shows available for re-assignment (equipment & facility)	Provisioning	SWITCH		100.0%	-	R	$ -
20	SOAC receives COE, OSP, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
30	SOAC delivers equipment and facility information to NSDB	Provisioning	NSDB		0.0%	-	R	$ -
32	NSDB downloads assignments to OPS/INE	Provisioning	OPS / INE		0.0%	-	R	$ -
36	OPS/INE delivers disconnect message to INE	Provisioning	OPS / INE		0.0%	-	R	$ -
38	OPS/INE updates WFA/C	Provisioning	OPS / INE		0.0%	-	R	$ -
40	WFA/C updates NSDB	Provisioning	OPS / INE		0.0%	-	R	$ -
47	***Pull and Analyze Order Steps***							
48	Pull and analyze order: FCC; (copper%)	Provisioning	ILEC manual activity	FCC	100.0%	2.50	$ 43.29	$ 1.80
55	***Travel Time Steps***							
56	Travel time to the central office: CO non staffed, # orders per trip, Copper	Provisioning	ILEC manual activity	FCC	5.0%	20.00	$ 43.29	$ 0.72
71	***Element Type Detail Steps***							
79	Remove jumper from MDF	Provisioning	ILEC manual activity	FCC	100.0%	0.50	$ 43.29	$ 0.36
84	Remove DSO TSI at RT (CPU Time)	Provisioning	CPU Time		0.0%		R	$ -
198	***Fall Out Steps***							
202	Fall Out: RMAs forwarded to PAWS for reconciliation	Provisioning	CPU Time		2.0%		R	$ -
203	Fall Out: Pull and analyze order: LAC	Provisioning	ILEC manual activity	LAC	2.0%	2.50	$ 41.75	$ 0.03
204	Fall Out: Resolve fallout: LAC	Provisioning	ILEC manual activity	LAC	2.0%	15.00	$ 41.75	$ 0.21
209	***Close Order Steps***							
210	Close order: FCC:Copper%	Provisioning	ILEC manual activity	FCC	100.0%	1.50	$ 43.29	$ 1.08
217	***Close Order Provisioning Steps***							
218	SOAC updates SOP	Provisioning	SOAC		100.0%	-	R	$ -
219	SOAC updates WFA, NSDB, LMOS, BOSS, CRIS, etc.	Provisioning	SOAC		100.0%	-	R	$ -
221	SOP completes LSR	Provisioning	SOP		100.0%	-	R	$ -
222	ILEC gateway notifies CLEC of completed order	Provisioning	ILEC gateway		NA			
224	***End of Process Steps***							$ 4.21

Select #	New Jersey - NRC Elements	Total Cost		Total Cost	
6	POTS / ISDN BRI Migration (UNE Loop) 100% IDLC	$ 0.27	<-- with overhead	$ 0.24	<-- without overhead

6

SERVICE ORDER PROCESS / NON-RECURRING TYPE MATRIX

1	2	3	4	5	6	7	8	9
ID No.	Process Flow / Activity	Step	System or Action	Work Center	A Probability (%)	B Time (minutes)	C Rate ($/hour)	D = (A x B x C) / 60 Cost w/out Overhead ($)
1	***Pre Order Steps***							
2	CLEC customer contact	Pre-Order	CLEC Customer Service Representative		NA	-		
3	CLEC requests customer address data, CSR, and appointment from ILEC	Pre-Order	CLEC gateway		NA	-		
4	ILEC gateway requests address data from Administrative Information System and CSR	Pre-Order	Premis, ALOC, BOSS, CRIS		100.0%	-	R	$ -
6	***Ordering Steps***							
7	CLEC customer service representative inputs LSR information into LOS	Order	ACTIVIEW		NA			
8	ILEC gateway receives, validates and logs LSR, returns FOC, and passes LSR to SOG	Order	ILEC gateway, STAREP, DOE		100.0%	-	R	$ -
10	ILEC SOG retrieves CSR data, formats and passes to SOP	Order	BOSS, SOP		100.0%	-	R	$ -
11	***Provisioning Processing Steps***							
13	SOP sends request to SOAC	Provisioning	SOP		100.0%	-	R	$ -
14	SOAC analyzes order, generates assignment requests for OSP, COE, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
16	LFACS makes OSP assignments, e.g., cable and pair	Provisioning	LFACS		100.0%	-	R	$ -
18	SWITCH provides equipment and facility assignments	Provisioning	SWITCH		100.0%	-	R	$ -
20	SOAC receives COE, OSP, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
27	SOAC delivers recent change translation information	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
29	MARCH updates LDS	Provisioning	MARCH (ASAP for ISDN BRI)		100.0%	-	R	$ -
30	SOAC delivers equipment and facility information to NSDB	Provisioning	NSDB		100.0%	-	R	$ -
32	NSDB downloads assignments to OPS/INE	Provisioning	OPS / INE		100.0%	-	R	$ -
34	OPS/INE delivers cross connect and equipment provisioning message to INE	Provisioning	OPS / INE		100.0%	-	R	$ -
40	WFA/C updates NSDB	Provisioning	OPS / INE		100.0%	-	R	$ -
47	***Pull and Analyze Order Steps***							
48	Pull and analyze order: FCC; (copper%)	Provisioning	ILEC manual activity	FCC	0.0%	2.50	$ 43.29	$ -
55	***Travel Time Steps***							
56	Travel time to the central office: CO non staffed, # orders per trip, Copper	Provisioning	ILEC manual activity	FCC	0.0%	20.00	$ 43.29	$ -
71	***Element Type Detail Steps***							
73	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	0.0%	0.25	$ 43.29	$ -
74	Install cross connect from MDF to CFA appearance	Provisioning	ILEC manual activity	FCC	0.0%	1.00	$ 43.29	$ -
76	Perform continuity test (check dial tone and ANI)	Provisioning	ILEC manual activity	FCC	0.0%	0.25	$ 43.29	$ -
82	Install DSO TSI at RT (CPU time)	Provisioning	CPU Time		100.0%		R	$ -
198	***Fall Out Steps***							
202	Fall Out: RMAs forwarded to PAWS for reconciliation	Provisioning	CPU Time		2.0%		R	$ -
203	Fall Out: Pull and analyze order: LAC	Provisioning	ILEC manual activity	LAC	2.0%	2.50	$ 41.75	$ 0.03
204	Fall Out: Resolve fallout: LAC	Provisioning	ILEC manual activity	LAC	2.0%	15.00	$ 41.75	$ 0.21
209	***Close Order Steps***							
210	Close order: FCC;Copper%	Provisioning	ILEC manual activity	FCC	0.0%	1.50	$ 43.29	$ -
217	***Close Order Provisioning Steps***							
218	SOAC updates SOP	Provisioning	SOAC		100.0%	-	R	$ -
219	SOAC updates WFA, NSDB, LMOS, BOSS, CRIS, etc.	Provisioning	SOAC		100.0%	-	R	$ -
221	SOP completes LSR	Provisioning	SOP		100.0%	-	R	$ -
222	ILEC gateway notifies CLEC of completed order	Provisioning	ILEC gateway		NA			
223	ILEC billing system issues final bill to migrating customer	Provisioning	ILEC gateway		NA			
224	***End of Process Steps***							$ 0.24

Select #	New Jersey - NRC Elements	Total Cost		Total Cost	
8	POTS / ISDN BRI Disconnect (UNE Loop)	$ 0.27	<-- with overhead	$ 0.24	<-- without overhead

8

SERVICE ORDER PROCESS / NON-RECURRING TYPE MATRIX

1	2	3	4	5	6	7	8	9
ID No.	Process Flow / Activity	Step	System or Action	Work Center	A Probability (%)	B Time (minutes)	C Rate ($/hour)	D = (A x B x C) / 60 Cost w/out Overhead ($)
1	***Pre Order Steps***							
2	CLEC customer contact	Pre-Order	CLEC Customer Service Representative		NA	-		
4	ILEC gateway requests address data from Administrative Information System and CSR	Pre-Order	Premis, ALOC, BOSS, CRIS		100.0%	-	R	$ -
5	ILEC gateway formats and returns address, CSR, and appointment data to CLEC	Pre-Order	WFA/FORCE, ACTIVIEW		100.0%	-	R	$ -
6	***Ordering Steps***							
7	CLEC customer service representative inputs LSR information into LOS	Order	ACTIVIEW		NA			
8	ILEC gateway receives, validates and logs LSR, returns FOC, and passes LSR to SOG	Order	ILEC gateway, STAREP, DOE		100.0%	-	R	$ -
11	***Provisioning Processing Steps***							
13	SOP sends request to SOAC	Provisioning	SOP		100.0%	-	R	$ -
14	SOAC analyzes order, generates assignment requests for OSP, COE, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
17	LFACS makes OSP spare and available for reassignments, e.g., cable and pair	Provisioning	LFACS		100.0%	-	R	$ -
19	SWITCH inventories as spare and shows available for re-assignment (equipment & facility)	Provisioning	SWITCH		100.0%	-	R	$ -
20	SOAC receives COE, OSP, IOF, etc.	Provisioning	SOAC		100.0%	-	R	$ -
30	SOAC delivers equipment and facility information to NSDB	Provisioning	NSDB		100.0%	-	R	$ -
32	NSDB downloads assignments to OPS/INE	Provisioning	OPS / INE		100.0%	-	R	$ -
36	OPS/INE delivers disconnect message to INE	Provisioning	OPS / INE		100.0%	-	R	$ -
38	OPS/INE updates WFA/C	Provisioning	OPS / INE		100.0%	-	R	$ -
40	WFA/C updates NSDB	Provisioning	OPS / INE		100.0%	-	R	$ -
47	***Pull and Analyze Order Steps***							
48	Pull and analyze order: FCC; (copper%)	Provisioning	ILEC manual activity	FCC	0.0%	2.50	$ 43.29	$ -
55	***Travel Time Steps***							
56	Travel time to the central office: CO non staffed, # orders per trip, Copper	Provisioning	ILEC manual activity	FCC	0.0%	20.00	$ 43.29	$ -
71	***Element Type Detail Steps***							
79	Remove jumper from MDF	Provisioning	ILEC manual activity	FCC	0.0%	0.50	$ 43.29	$ -
84	Remove DSO TSI at RT (CPU Time)	Provisioning	CPU Time		100.0%		R	$ -
198	***Fall Out Steps***							
202	Fall Out: RMAs forwarded to PAWS for reconciliation	Provisioning	CPU Time		2.0%		R	$ -
203	Fall Out: Pull and analyze order: LAC	Provisioning	ILEC manual activity	LAC	2.0%	2.50	$ 41.75	$ 0.03
204	Fall Out: Resolve fallout: LAC	Provisioning	ILEC manual activity	LAC	2.0%	15.00	$ 41.75	$ 0.21
209	***Close Order Steps***							
210	Close order: FCC;Copper%	Provisioning	ILEC manual activity	FCC	0.0%	1.50	$ 43.29	$ -
217	***Close Order Provisioning Steps***							
218	SOAC updates SOP	Provisioning	SOAC		100.0%	-	R	$ -
219	SOAC updates WFA, NSDB, LMOS, BOSS, CRIS, etc.	Provisioning	SOAC		100.0%	-	R	$ -
221	SOP completes LSR	Provisioning	SOP		100.0%	-	R	$ -
222	ILEC gateway notifies CLEC of completed order	Provisioning	ILEC gateway		NA			
224	***End of Process Steps***							$ 0.24